ESSAYS IN ACCOUNTING THEORY

CARL THOMAS DEVINE

Volume I

UNIVERSITY OF
ILLINOIS LIBRARY
AT URBANA-CHAMPAIGN
[redacted]

OPEN SHELF

ESSAYS IN ACCOUNTING THEORY

CARL THOMAS DEVINE

Volume I

1962

657
D496e
v.1

FOREWORD

These essays may or may not belong to what is generally considered to be the field of accounting, but they are related to what accountants do, and if the definition is not too rigid, they form a book. Many of the essays are repetitious, for, in spite of the complicated jargon of modern scientific method, the message is comparatively simple. Accountants are concerned with individuals striving for objectives. Accountants attempt to furnish an information-control system that helps these individuals attain their goals. In the process accountants identify events that promise to be pertinent to future decisions and actions; they select aspects of these events that promise to be useful, and they construct conventions for measuring and reporting relevant aspects of the selected events. In short, accounting is a part of behavioral science.

The reader is warned of numerous footnotes and long quotations that may add up to a form of intellectual name dropping. In part, these notes are a violent reaction to the general callousness of many current writers, who all too often quote a late easily-reached article or, worse, do not quote at all. The reader should be warned also of the vocabulary that is currently popular in business and behavioral science. This when combined with technical accounting terms and the writer's weakness for complicated grammatical forms may sometimes result in slow and difficult reading. Workers in related fields often express their research output with this vocabulary so that a little additional effort on the part of the reader may prove to be beneficial.

There is a monumental debt to a host of bright and interested students who responded to being treated as rational beings. A debt of equal magnitude is due my colleagues and former colleagues who, between weary classroom sessions, have spent innumerable smoke-filled hours arguing and wrangling endless succession of problems. The list is a long one. Laura MacAdams, Sue Heines, Jeremiah Lockwood, Oscar Nelson, Fred Woodbridge, Val Lehnberg, Edwin Lamb, Robert Dinman, Malcolm Pye, James Lanham, Lawrence Benninger, Richard Mattessich, Billy Goetz, David Green, Jr., Charles Horngren, George Sorter, Sidney Davidson, Hadibroto, Tan Hian Kie, Rogo, Rosalinda Atienza, and members of the Ivory-Tower Committee: Maurice Moonitz, Myron Gordon, Carl Nelson and Paul Kircher. Among teachers the following deserve special notice: Benton Talbot who insisted that being a bookworm is a respectable activity for a mature human being; William A. Paton, whose no~~n~~-nonsense approach to intellectual activity was a pleasant shock; A. P. Ushenko, who encouraged minds to be a little erratic and, if possible, develop mutations in the form of useful insights. For Drue and Steve, who somehow refrained from mutiny.

CONTENTS

VOLUME I

Essay		Pages
I.	**Accounting - Toward a Suitable Philosophy** Toward a Scientific Basis. Metaphysics Rejected. Operationism. Axiomatic Approach. Holistic and Atomistic Views. Criteria for Rule Selection.	1 - 18
II.	**Comments on Accounting and its Environment.** Some Underlying Observations. Event-Recognition. Rules and Entity Selection. Events and Values. Measurement Rules. Appendix A: Exercise in Formulating Fundamental Accounting Equation. Appendix B: Defense for Historical Aspects of Accounting.	19 - 36
III.	**Accounting Profession - Simulation and Description.** Initial Conditions and Changes. How New Ideas are Introduced. Delays in the System. Professional Service and the Price System. Scope and Boundary Problems.	37 - 54
IV.	**Auditing - an Appraisal and some Recommendations.** Lack of Knowledge about Behavior. Communication of Objectives and Activities. Adequacy and Independence. Limperg's Behavioral Approach. Analysis of Opinions. Digression on Sampling. Methodological Suggestion.	55 - 69
V.	**Some Behavioral Aspects of Accounting** Some Pertinent Questions. Lack of Knowledge of Behavioral Reactions. Stedry on Budgeting. Comments on More General Psychological Matters. Lewin, Brunswik, Tolman.	70 - 85
VI.	**Normative Considerations - Sociology and Ethics** General Comments on Ethics. Place of Value Systems in Social Organizations. Sociology of Knowledge. DR Scott and the Professional Replacement of the Price System. Ethics of Managerial Accounting.	86 - 103

Essays Pages

VII. The Accounting Teacher and the Semantic Problem 104 - 112
Semiotic. Bias. Abstraction. Inference. Judgment.

VIII. Accounting Semantic Difficulties 113 - 128
True Income. Truth by definition. "Throwing Logic to the Winds." Consistent Behavior. Distortion. Illustrations from Gilman, Paton, Moonitz.

IX. Some Problems of Disclosure 129 - 143
Impossibility of "full" disclosure. Disclosures to Whom? Disclosure of What? Methods of Disclosure. Some Current Sore Spots.

X. Accounting - A System of Measurement Rules 144 - 159
Nature of Measurement. Stevens and Torgerson on Measurement Scales. Measurement Lessons from Psychologists. Discriminating, Classifying and Ordering. Similarity of Quantitative Information. Definition in Terms of Measurement Methods Used. Accounting Applications.

XI. Belief, Evidence and Nature of Proof I 160 - 177
Proof must be Psychologically Satisfying. Relationship of Bayesian Statistics to Belief. Objectivity. Objectivity in Science. Comments on the Legal Approach to Evidence.

XII. Belief, Evidence and Nature of Proof II 178 - 200
Mathematical and Logical Proof. Heuristic Reasoning. Scientific Explanation. Subjective Probability and "Modern" Statistics. Induction. Digression on and Illustration of Logical (Analytical) Proof. Explication.

Digitized by the Internet Archive
in 2025 with funding from
University of Illinois Urbana-Champaign Alternates

https://archive.org/details/essaysinaccounti01devi

CONTENTS

VOLUME II

Essay — Pages

XIII. The Unit Problem — 201 - 216
Entity Problem Reviewed. Holistic and Aggregative Approaches. Effects of Time Intervals. Capital - Revenue Expenditures Related to Firm and to Renewal Depreciation. Orange-Grove Illustration. Cost or Market on Units or Entire Stock? Shrinkage and Lost-Unit Costs. Degression on Organic View of Organizations.

XIV. Doctrine of Management Intent — 217 - 226
Difficulties of giving Professional Opinion on Intention of Others. Intent as Stability of Plans. Can Intention Create or destroy Assets and Liabilities? Can Intent alter Values?

XV. Income and the Case for Current Costs — 227 - 240
Uses of Income. Income and Allocation of Scarce Resources. Incremental Investors often share Existing Prospects. Partial Obsolescence and Technological Changes Reflected in Current Costs.

XVI. Income - Discounting Future Expected Receipts — 241 - 249
The Economists' Model of Income. Circularity. Is Income equal to Discount Rate? Capitalizing Optimism and Pessimism. Discounting as a Smoothing Device. Relationship of Expectation Changes to Date of Event.

XVII. Income - The Accountants' Approach — 250 - 257
Income under Certainty. If Capital Intact, Discounting Future not essential. Capital - Revenue Expenditures Again.

XVIII. Cost - Value Identification and Income Measurement — 258 - 270
Relationship of Original Cost and Expectations. Cost as Minimum Value of Expectations. Effect of Surges in Optimism. Markdowns. Imputation of Services to Individual Assets and to Firm.

XIX. Recognition Requirements - Income Earned and Realized. — 271 - 285
Income Earned as Value Added. Required Evidence for Value Increase. Percentage of

Essays Pages

Completion. Realization as Working Capital Availability. Desirability of Including Liquidity Requirement in Definition of Income.

XX. Realization Difficulties - Dividends 286 - 300
Dividends as Inter-Entity Transactions. Accounting Entity Discussed in Detail. Dividends in Property. Dividends in Stock. Change-of-Relative-Interest Test for Income.

XXI. Another Look at LIFO 300 - 312
Cyclical Prices Replaced by New Plateaus. Objections to LIFO. Identified Cost not Ideal. Effect of Price Changes at Increasing and Decreasing Rates. Relationship to Renewal Depreciation.

XXII. Goodwill - The Problem of Unrecorded Values 313 - 326
Unrecorded Values. Estimating Future Prospects. Buying a Job. Buying Monopoly Rights. Schmalenbach's Value added by Survival. Profit from Trading on the Equity. Amortization Problems.

XXIII. Comments on the Direct Costing Controversy I 327 - 337
Initial Conditions and Preserving Environment Suitable for Shortrun Decisions. All Useful Costing based on Uniformities and Expectations of Relevance to Future Decisions. Ordering of Decisions becomes Important. The Heritage Problem. What are Period Costs?

XXIV. The Direct-Costing Controversy II (Income Measurement.) 338 - 348
Accountants' Benefit Criterion Re-examined. Difficulties of Specifying Nature of Benefits. Accountants' Ability to convert Fixed Costs into Variable Costs. Effects of out-of-phase Production and Sales on Reported Income. Special Cases. Relationship of Direct-Costing to Renewal Depreciation.

XXV. Some Aspects of Scientific Method I 349 - 365
Survey and Review of Scientific Methodology. Structural Elements of Science. Logic in Science and Analytical Proof. Place of Hypothesis and Science. Thurstone's Factor Analysis.

Essay		Pages
XXVI.	Some Aspects of Scientific Method II Causation in Science. Rational Behavior. Problems of Definition. Operational and Constitutive Definitions. Some Accounting Definitions (Paton, Vatter). Examined Methods of Scientific Investigations. Definitions a Technical Digression. Explication.	366 - 386

ACCOUNTING - TOWARD A SUITABLE PHILOSOPHY

"...the problem of the philosopher is not about the world but about experience."[1]

It seems appropriate to begin a series of essays devoted to accounting theory with the most general discussion. Such a beginning permits the reader to appraise the writer's system of values and to make allowances for peculiar attitudes and bias. Such a discussion may help to unify the accepted beliefs of a profession. Practically all thoughts worth having and beliefs worth holding are based on a series of preconceptions which are remnants of several philosophical systems. Thus, a thoughtful review of various competing philosophical systems may help to organize and clarify the attitudes of many professional, practice-oriented accountants. At the very least such a discussion should help the reader escape the rigid boundaries and constraints of an occupational area. At the more practical level some competing information systems have well-developed structures that deserve to be treated as philosophies. In fact, management science and its related branches such as operations research attempt to differentiate their product by the unity of method by which all problems are approached. Meanwhile, it is probably safe to say that the philosophical probing carried on by most accountants is far too well characterized by the shallow and pompous tirades frequently published on accounting as an art versus accounting as a science.

The purpose of this essay is to set forth at least one acceptable approach for those who practice an information-control system such as accounting. In the course of this task a number of competing views are examined. To introduce such a vast and poorly-organized territory we shall begin at a fairly low level of abstraction by observing what those interested in the field of management science appear to hold. As it turns out, the philosophical background for an effective management science program is almost directly applicable to the field of accounting. This overall view is outlined briefly and is followed by an overview of some of the broader implications. Further coverage of scientific method and the organic conception of organizations may be found in subsequent

---

[1] Hector Hawton, Philosophy for Pleasure (New York: Fawcett Publications, Inc., 1956), p. 178. Thurstone states: "A scientific law is not to be thought of as having an independent existence which some scientist is fortunate to stumble upon. A scientific law is not a part of nature. It is only a way of comprehending nature." Louis Leon Thurstone, Multiple - Factor Analysis: A Development and Expansion of the Vectors of Mind (Chicago: University of Chicago Press, 1947), reprinted in Readings in Philosophy of Science, ed. Philip P. Wiener (New York: Charles Scribner's Sons, 1953), p. 193.

essays. For those readers with little interest in the philosophical aspects of accounting this overview may be adequate for an understanding of the more traditional essays that follow.

As a preliminary step, it should be repeated that management scientists are committed to a thorough-going scientific approach and to the thesis that the unity of scientific method is unquestionably applicable to all their problems. A kit of mathematical and observational instruments are available, but they are applied after the problem has been subjected to scientific analysis and the pertinent relationships placed in a framework (model) that can be solved in either analytic or approximate fashion. Undoubtedly some practitioners are overly quick to reach into the medicine cabinet before adequate diagnosis, and obviously the scientific appraisal is sometimes twisted to help fit the specific types of models which the researcher prefers or manipulates with confidence. These cases should not obscure the accepted ideal of the unity of method that underlies all problems regardless of the specific procedures employed.

The so-called scientific approach is appropriate for accounting and operations research, in particular, and for business research in general. Uniformities in experiences (the sensible data) are observed, inferred, defined, classified and related to other simple observations of the same general kind. These simple interpretations (facts) are then combined and arranged to form higher-level and more complicated constructs which are related to one another by constitutive definitions made up of intervening variables and relationships expressed as equations or as less definite explications of various kinds. In order to avoid constructs that tend to orbit in metaphysical space it seems desirable to require that all constructs must be related in such a way that they may be "reduced" to the relatively simple data of the sensible world. Thus many constructs may be defined only in terms of others, e.g., net worth, but we require that such constructs be tied to the world of sensible data directly by rules of correspondence (operational definitions) or by constitutive definition and intervening variables to other constructs that may in turn be so reduced. A good definition then is one that enters into other definitions in an explanatory fashion and also has sharp, well-defined rules of correspondence (instructions) for connecting it to the sensible data.

The research specialist, or indeed anyone who thinks seriously, will sometimes be able to travel on constitutive definitions and relations in the abstract theoretical space for long stretches without returning to the mundane field of observational data. New relationships may be assumed or deduced, and new definitions may be formed from other abstract definitions. Such hypotheses are said to be "operationally meaningful" in the sense that they may be tested for relative truth or falsity by experiment or directed observation of the data. Hypotheses may relate to non-empirical constructs, but unless they can be reduced to empirical data they are said to be pseudo-propositions or nonsense statements. 'Meaning' is therefore defined in terms of possibilities for (or sometimes methods of) verification, and 'nonsense' statements are not necessarily 'nonsense' in the usual sense but are incapable of reduction to data of

the sensible world. They are without sense content, i.e., have no effective rules of correspondence tying them directly or indirectly to observational data.

The above description is essentially that of scientific method. Such a method consists of the repeated interaction of hypotheses and deductions from the abstract area with observations and inferences from the sensible data.[2] We shall return to a more detailed discussion later in connection with operationism, logical empiricism, and pragmatism as schools of thought.

Thus the task facing accountants and similar systems specialists includes observing the environment, searching the environment for behavior patterns, and (usually) imputing objectives and goals to those who establish the patterns. In the typical case accountants have adopted a kind of teleological approach which observes actions, infers ends, accepts the prevailing social valuation of the worthiness of such ends, and recognizes acceptable patterns that tend to accomplish desirable goals. Accountants then accept as their proper domain the gathering and reporting of information that will facilitate movement toward such goals and retard actions that will lead to non-acceptable objectives.

A teleological approach is always subject to certain dangers. Behavior patterns may be searched for uniformities in orthodox scientific ways. These uniformities may indeed suggest goal-searching activities and permit highly confirmable inferences as to the goals themselves. Once we infer the objectives we feed the inferences (inferred goals) back into our system as "causes" of the behavioral actions. This approach is not objectionable in itself, but, as is pointed out latter, it may lead to a "volitional" philosophy in which all causes are related to personalities. Thus we may have gods pushing the sun across the sky and regulating all sorts of other things. The danger is due to a tendency toward anthropomorphism in which one imputes personal volition to the behavior of the physical world or, worse, imputes supposed divine-like behavior to human beings. The objection to anthropomorphism is not that

---

[2] Physics has a highly developed theoretical area in which long and complicated journeys may be taken without visiting constructs that are directly tied to observables by operational rules. A good usable approach to the meaning of theory can be constructed from this interaction of abstraction and observation. "Laws describe regularities and are employed in order to explain and predict particular occurrences and phenomena. But often we wish an explanation of the regularity itself. One way of achieving this in science is to deduce the law which describes this regularity from some other law of a higher degree of generality.... typically, a whole family of laws...may be deduced from a very few laws of high generality. When this is achieved, these highly general laws will be a theory for the family of laws which are deducible from them..." Philosophy of Science, ed. Arthur Danto and Sidney Morgenbesser (New York: Meridian Books, Inc., 1960), p. 178. Unfortunately rules for determining degree of generality are not too well developed. Moreover, facts themselves are interpretations so that the operationally meaningful approach is not as clearcut as it seems.

it is demonstrably false (It may be true!), but that in the past it has not furthered scientific investigation and does not seem very likely to help future investigation.

Practitioners of operations research have sometimes been accused of constructing simplified models and placing them between the individual and some sort of assumed "real" world.[3] Such models are simplified so that the limited powers of the human mind can grasp the relationships. They are then solved and presented with the hope that the solutions will have some carry-over application to the "real" situation. This pseudo criticism has also been leveled at accountants. Accountants have a long-established tradition for abstracting entities, tracing only limited aspects of business decisions, and recording only a few of the many events that enter into the biography of an organization. They have therefore been accused of dealing with "shadows," "adumbrations," and "ghosts of long-departed assets."

The accounting structure is certainly a highly abstract model of the relations, properties, and events of an organization. (The concept of asset, for example, abstracts from almost all aspects of a string of events except that of probable service potential of a limited sort.) The point that critics overlook is that knowledge of the "outside" world and one's view of life itself is a model composed of the interactions of memory and sense organs. In effect the "world" is a model constructed from the reports of sense perceptors. Such a model may be highly simplified so that we can solve it or at least cope with it. Or the solipsist may be correct: the individual's model may indeed be the entire world. Luckily one can afford the luxury of the skeptic and withold judgment. To impute an external world with things-in-themselves is gratuitous, but at times it may prove to be useful and even reassuring to do so. Let us now turn to some more traditional philosophical questions.

Metaphysics and Solipsism Rejected

The fashion for many centuries was to erect from a few assumptions a methaphysical structure that would explain everything that might come before the human mind. The effect was to speculate about the universe behind the physical universe: to fill in by speculation the gaps in knowledge that were not filled by scientific inquiry. These philosophical systems were discussed and one-by-one became less popular not because they were proved to be false but because other philosphers did not agree with the initial assumptions or non-philosophers became bored with discussing them and turned to other speculative systems. Metaphysics has indeed suffered a decline in this century in spite of a seemingly le-

---

[3] Kenneth Boulding has recently taken an untenable position in this regard. His outraged concern over the present lack of respect for non-quantitative methods seems to have influenced him to take an extreme anti-model-making view. See "Evidences for an Administrative Science," Administrative Science Quarterly, June, 1958.

gitimate function of trying to provide a framework independent of the experience it hopes to interpret -- a sort of model for the empirical world.

It is probably true that only in rare cases or in the fields of esthetics, ethics and morals have broad metaphysical systems been effective in any way. According to Carnap: "Metaphysicians cannot avoid making their propositions non-verifiable, because if they made them verifiable, the decision about the truth or falsehood of their doctrines would depend upon experience and therefore belong to the region of empirical science."[4] Metaphysicians have often asserted that they have a new kind of knowledge that is somehow more fundamental than and superior to knowledge derived from experience. Such an attitude seems out of place in a pragmatic service field such as accounting. This point normally would not deserve mention, yet to many accountants there is something hypnotic about debit and credit that sometimes leads to mystical attitudes and expressions. For example, some accountants have spoken of attached and embodied costs, have preserved equity among periods and units of production, have insisted on measuring true income or finding true cost, have argued that the revenue figure is composed in part of costs, and have held appropriate rites over expired costs.

Opposed in some respects to these grandiose metaphysical systems in the doctrine of solipsism, which is treated with intellectual respect by most philosophers but which has little or no effect on what men think or how they proceed with the business of living. This simple doctrine obviously cannot be refuted, and in the words of Hawton, "It is not merely logically irrefutable; it is obviously true. "What you and I would regard as 'Professor Dingle' is not given to us in experience

---

[4] Reported by Hector Hawton, op.cit., p. 165. Russell has pointed out that there is no reason to believe that everything is related to everything else, and Hawton emphasizes that to a grandiose metaphysician the success of science which had, at best, a dinky philosophical structure was startling. "It became apparent that the experimentalists were working on profitable lines, but why they should obtain such good results was something of a puzzle. It was extremely difficult to find a theoretical justification for the procedure they followed so successfully." Ibid., p. 131. White emphasizes the twentieth-century reaction against the "absolute" and metaphysics generally. Hegelian metaphysics with its "world spirit" (absolute idea) with goals and a soul of its own, was probably the apex of metaphysical thought. White also discusses the factors that probably led to the growth of such ideas. Accountants are more committed to Russell's view that events can be partially controlled than to the Hegelian view of inexorable historical process. See Norton White, The Age of Analysis (New York: The New American Library, 1955), Chapter I.

which we call seeing him, hearing him."[5] The point to be emphasized is that the solipsistic approach makes no representations about external objects and beings, and the importance of it in modern philosophy is that it shows that such assumptions are unnecessary for rational activity. Such things as matter, space, events and Dingle himself, are mental constructs made up of these experiences, and there is no necessity for assigning 'existence' or 'objectivity' or 'reality' or any other high-sounding word to them. Solipsism is not likely to be a useful theory for auditors who are committed to "verifiable objective" evidence. While it seems that a Crusoe could be a scientist and test his own hypotheses by observation and replication, the basis of auditing is the use of independent ability and the expression of independent opinion. Thus we shall accept without complete proof the assumption of interpersonal existence and the collateral assumption that objectivity may be defined operationally as the agreement of trained observers.

Operationism

This writer's own subjective approach to philosophy and his framework for investigating and correlating information is essentially that of operationism. It is believed that operationism is an effective set of assumptions and judgments for investigating the essentials of accounting theory. This method of viewing and organizing experience is closely related to the doctrines of empiricism, behaviorism, pragmatism, and instrumentalism.[6] Operationism makes use of logic and mathematics

---

[5] Ibid., p. 169, 170. See Herbert Dingle, Through Science to Philosophy (1936 Lowell Institute Lectures, Oxford: The Clarendon Press, 1937). In the same tradition as Johnson's pedi-answer to Berkeley is Morris Cohen's "...my safety and my continued sanity depend upon recognizing that the automobile and its driver are realities having a history and purpose independent of my own." Reason and Nature (Glencoe: The Free Press, Publishers, 1953), p. 63. A more pedestrian operational view is expressed by Thurstone. "While the ideal constructs of science do not imply physical reality, they do not deny the possibility of some degree of correspondence with physical reality." Op.cit., p. 193.

[6] An interesting classification was made by William James. "Empiricism, Skepticism, Naturalism, Positivism, and Pragmatism are typical thought movements of the worldly, tough-minded variety. Respect for the facts of experience, open-mindedness, an experimental trial-and-error attitude...distinguish them from the more impatient, imaginative...thinkers in the tender-minded camp. Among the latter are speculative metaphysicians, intuitionists, rationalists, and absolute idealists." "Logical Empiricism," Readings in Philosophical Analysis, ed. Herbert Feigl and Wilfrid Sellars (New York: Appleton-Century-Crofts, Inc., 1949), pp.3-4. See also Morton White, The Age of Analysis, op. cit., p. 136.

but realizes that these branches are tautological and can yield information about the world only by making implications more readily discernible by showing consistency, and helping to avoid contradiction. Operationism is empirical in that it accepts experiences, looks for uniformities and tries to find relations among them. Even the question as to whether the knowledge is real or a mirage is not important to operationism; reality is a matter of classification and definition.

> Raw experience is "the given"....We cannot classify and arrange until we have invented some scheme of classification. To do this we must invent abstract terms (concepts), and, because we must possess them before we can apply them, they are *a priori*....Is it real or a mirage? That is simply a question of classification. We invent the term "reality" and define it in such a way that what does not fit is "mirage." ...What is orderly we call "real,"....The category "unreal" is a temporary pigeon-hole for otherwise unclassified experiences.[7]

Perhaps the outstanding difference between operationism and the various early forms of positivism is that the former does not weaken its own case by trying to explain everything empirically. Stevens states the case.

> The blemish on positivism was that in its reaction against rational metaphysics it pretended to base *everything* in science on experience. Operationism, however, acknowledges the role of the rational methods of mathematics and logic -- formal disciplines

---

[7] C.I. Lewis, *Mind and the World Order* (New York: Dover Publications, Inc., 1956). Scientists must make assumptions which are not completely supported by observation. "...'it is a metaphysical presupposition of science that the world is predictable...'" Arthur Pap, "*Does* Science Have Metaphysical Presuppositions?" *Readings in Philosophy of Science*, *op. cit.*, p. 454. Bertrand Russell concludes that: "We must... accept analogy - in the sense in which it goes beyond experience - as an independent premise of scientific knowledge." *Human Knowledge*, *Its Scope and Limits* (New York: Simon & Schuster, 1948), p. 193. In fact many philosophers have discussed the *methaphysics of science*.

Most of these so-called metaphysical presupposition are currently useful *assumptions* that help scientific prediction and are not considered to be immutable truths. The relations of logic may be called 'metaphysical' or they may be considered to be coventions based on convincing experience that they work. Sidney Hook published *The Metaphysics of Pragmatism* (Chicago: The Open Court Publishing Co.) in 1927, and recently Nicholas Dopuch has expanded the title to "Metaphysics of Pragmatism and Accountancy," in *The Accounting Review*, April, 1962. Unfortunately Dopuch betrays a penchant for the older semi-Hegelian metaphysics with such statements as "natural process," "The world has ends within its own process," "The world does not guarantee progress," etc. Such statements are flagrant examples of reification and their usefulness is doubtful.

> which do not appeal to experience for verification, but only to conventions. Science uses these formal systems as models for representing its data....When it is a matter of the significance of *empirical* rather than of *formal* propositions, needless to say operationism adopts an uncompromising positivistic attitude.[8]

Thus one who holds to the operational approach may have his own personal opinions about poetry, art, religion, ethics and the like, but he realizes that these things are speculation, depend on value judgments, and are not subject to the usual tests of truth or falsity and therefore to the rules of logical inference. The early operational approach set forth by Bridgman was more rigid in this respect and insisted that concepts which did not give a series of instructions for identifying and characterizing the construct were nonsense statements.[9] If it is not possible to find operations to yield an answer to a question it is, by definition, meaningless and without "sense content." For those accustomed to thinking in abstract terms it is extremely difficult to adjust to a strictly operational approach, but the adjustment is not quite so severe when one realizes that there are "mental operations." "In general, we mean by any concept nothing more than a set of operations; *the concept is synonymous with the corresponding set of operations....if* the concept is mental, as of mathematical continuity, the operations are

---

[8] S. S. Stevens, "Psychology and the Science of Science," *Psychological Bulletin*, 36, pp. 221-263. Quoted from the reprint in *Readings in Philosophy of Science*, ed. Philip P. Wiener (New York: Charles Scribner's Sons, 1953), p. 166. An example of the early positivist view: "...science claims for its heritage the whole domain to which the word knowledge can be legitimately applied...." Karl Pearson, *The Grammar of Science*, p. 312. Morris Cohen expresses the more mellow view of a typical operationist: "The dogma that all reality is sensory or can be apprehended through sense organs alone is as gratuitous as the assumption that all reality is audible, or that all reality is odorous." *Op. cit.*, p. 197. To an extreme empiricist such as Mill and his disciples, Pearson, Bridgman, etc., the "*a priori*" aspects of logic and mathematics are also the result of experience. Those "conventions" that survive meet the needs of those who interpret experience and are themselves the result of induction. P. W. Bridgman states: "Mathematics thus appears to be ultimately just as truly an empirical science as physics or chemistry...." *The Nature of Physical Theory* (New York: Dover Publications, 1936), p. 52.

[9] P. W. Bridgman, *The Logic of Modern Physics* (New York: The Macmillan Company, 1928, 1960). Feigl feels that the foundations of operationism precede Bridgman by a half century: He cites C. S. Peirce, "How to Make Our Ideas Clear," *Popular Science Monthly*, January, 1878 See Herbert Feigl~~s~~, *op. cit.*, p. 508.

mental operations...."[10]

A little reflection will show that some fantastically stupid questions with no possibility of operational validity are not nonsense or meaningless in the broad, everyday sense. Their psychological effects may be tremendous. Demagogues make wide use of such statements, and inevitably most religious statements are non-operational. Ayers, a staunch logical positivist, takes an operationist viewpoint and offers the following comment on preference statements (value judgments).

> ...it does not follow...that two persons cannot significantly disagree about a question of value, or that it is idle for them to attempt to convince one another. For a consideration of any dispute about a matter of taste will show that there can be disagreement without formal contradiction...it is not necessary to contradict anything that he asserts....since the expression of a value judgment is not a proposition, the question of falsehood does not here arise....if a man said that thrift was a virtue, and another replied that it was a vice, they would not...be disputing with one another. One would be saying that he approved of thrift, and the other that he didn't; and there is no reason why both these statements should not be true.[11]

Operationism is closely related to the behaviorist movement in psychology, but again it does not deny the possible existence and importance of such things as emotions, self, etc., Stevens states: "Like positivism behaviorism erred in denying too much. Operationism does not deny images, for example, but asks: What is the operational definition

---

[10] *Ibid.*, p. 5. Notice also: "To adopt the operational point of view...means a far-reaching change in all our habits of thought.... In some respects thinking becomes simpler, because certain old generalizations and idealizations become incapable of use; for instance, many of the speculations of the early natural philosophers become simply unreadable." (p. 31.) As an exercise accountants may wish to examine operationally the doctrine that all costs are recovered *pro rata* when revenues are insufficient to cover all costs.

[11] "Alfred Jules Ayer, *Language, Truth ang Logic* (New York: Dover Publications, Inc., 1946), pp. 21-22, 110. Notice the following expression of value judgments with respects to science. "...what higher and more spiritual goals could any man have than those involved in and implied by the whole enterprise of pure science -- cooperation, understanding, respect, truth, and a life guided by reason? Such a goal as eternal bliss in some heavenly hereafter is almost crudely hedonistic in comparison." "Science and Its Critics," Harold E. McCarthy, *The Humanist XII*, 2, (1952). Reprinted in *Readings in Philosophy of Science*, *op. cit.*, p. 437. Many non scientists with a humanist orientation will no doubt have different preference statements.

of the term 'image?'"[12] Accountants have, in fact, a long behaviorist tradition for observing business and economic behavior and trying to furnish information that encourages certain forms of behavior. At the present time accounting seems to be moving in the direction of more observations of this type, and decisions as to the reality of self, ego, etc., are usually not required.

Clearly operationism is not a form of monism, for until the fundamental irreducible substance is capable of being tested empirically, the individual must make his own speculations. What about dualism? Until things-in-themselves and other such monstrosities can be put to test and subjected to meaningful empirical tests they remain in the field of speculation. What about universals? There may be universals, and the individual is at liberty to believe in them or not. For most purposes the following statement fits. "For an empiricist, universals are symbolical devices for grouping particulars. The sparrow can be analysed into sense-data; bundles of sense-data can be re-grouped and handed over to various departments for study -- the colour and weight to the physicist ..."[13]

Operationism has been criticized because it is essentially reductive in outlook. That is, it assumes that all meaningful sentences can be reduced to atomic units or to the "thing" or physical language or statements that result in propositions that can be operationally tested for truth or falsity, e.g., propositions in the usual logical sense. How then can one ever generalize with such a philosophy? How can induction be applied? How do scientists generalize? Stevens has treated this problem.

> The process of generalization proceeds on the basis of the notion of classes....no empirical proposition is ever without some ele-

---

[12] S. S. Stevens, op. cit., p. 166. The early stages of behaviorism were in fact so dogmatic in their refusal to admit non-observables that C. D. Broad is reported to have classed behaviorism among "theories so silly that only very learned men would have thought of them." Quoted from Hector Hawton, op. cit., p. 167.

[13] Hector Hawton, op. cit., p. 178. "...life has been lived without absolute certainties. It may be true that some people are unhappy without the illusion of certainty, but it is also true that no human being can live rationally until he has freed himself from illusion." Harold E. McCarthy, op. cit., p. 437. For teaching purposes and for memory work it is sometimes useful to abstract from certain influences and treat the remainder as absolute dogma. It is probably safe to say that this device has an extremely limited range of usefulness before it begins to do more harm than good by inhibiting an inquiring mind. Consider, for example, the convention of debit and credit, which is usually presented to elementary students as an absolute dogma.

> ment of generality. Classification can proceed only when we have criteria defining the conditions for class-inclusion, and these criteria are essentially operational tests....Here we resort to that fundamental operation we have already called discrimination. If we can discriminate crucial differences between Dobbin and other animals we have named horses....On the basis of elementary discriminations, then, we make out first rudimentary classes and in doing so we have made the first step toward generalization. From there we advance to form classes of classes and to discover the relations between classes -- always, at the empirical level, in keeping with operational criteria.[14]

Operationism is closely related to a number of other philosophical movements, but it is practically identical with pragmatism and is related to logical empiricism (scientific empiricism). Logical empiricism is a more moderate version of what was known as logical positivism and was developed primarily by the members of the Vienna Circle.[15] Statements are two kinds: those that are empirical in content, and can be verified as to truth or falsity, and those that are formal sentences of syntax and are true by convention (stipulation). That is to say, formal sentences have no empirical content, but they are subject to the rules for manipulating sentences to get new sentences, e.g., the rules of logic and inference. Stevens traces the foundations of the system to Wittgenstein, who "made clear the formal nature of logic and showed that the rules and proofs of syntax should have no reference to the meaning (empirical designation) of symbols; and...showed that the sentences of metaphysics are pseudo propositions.[16]

This philosophy seems to be a generalization of the axiomatic approach to mathematics, statistics, mechanics, and biology. Certainly much of the model-making that has overwhelmed the social sciences is related to constructing and interpreting abstract systems. The widely-used technique is to construct an abstract set of symbols and specify the rules

---

[14] S. S. Stevens, op. cit., p. 168. Moritz Schlick speaks of "certain primitive acts of recognition...so that each component can be identified as belonging to a definite class and assigned to a corresponding symbol." "Description and Explanation," Readings in Philosophy of Science, op. cit., p. 470. Originally published in Philosophy of Nature, trans. Amethe von Zeppelin (New York: Philosophical Library, 1949).

[15] This group of intellectuals, (Schlick, Neurath, Carnap, Frank, Brunswik, and others) began their discussions in the mid-twenties and set forth the outlines for logical positivism, which among other things does away almost entirely with metaphysics (in general, non-operational statements) and replaces it with a study of the language and methodology of science. The works of Carnap and Brunswik are cited frequently in subsequent essays.

[16] S. S. Stevens, op. cit., pp. 169-170.

of transformation that will be permitted for manipulating these symbols. Theorems are proved, and a whole superstructure that bears no necessary relationship to anything empirical is developed.[17] Some controversy exists over whether the rules adopted for manipulating symbols (logical rules) are completely arbitrary. Positivists usually take the position that the selection is conventional but is not a matter of indifference. Certain rules of inference and transformation yield a more useful--rich--framework for making interpretations and are therefore pragmatically more desirable than others. An instrumentalist or empiricist, such as Mill, may argue that the conventions that have been adopted for logic and have survived are those that lead to useful interpretations. Thus the rules of logic are related to the needs of goal-seeking individuals and are the result of experience. They may have been developed through idle curiosity, but their survival may depend on the richness of the interpretations that can be applied to them.[18]

The second step conceptually, if not historically, is concerned with finding interpretations of the symbols in terms of properties and relationships that can be sensed or can be reduced to other data that can be sensed.[19] Advocates of logical empiricism tend to call interpretation

---

[17] "A Mathematical System is any set of strings of recognizable marks in which some of the strings are taken initially and the remainder derived from these by operations performed according to rules which are independent of the meanings assigned to the marks." C. I. Lewis, Survey of Symbolic Logic (Berkeley: University of California Press, 1918), p. 355. Or the voice of A. P. Ushenko, crying in the wilderness: "... the whole field of logic and mathematics consists of tautologies derived from other tautologies by means of tautologies." The Theory of Logic (New York: Harper & Brothers Publishers, 1936), p. 131.

[18] This insistence on a sharp distinction between syntax--the rules and the symbols--and the meaning of the symbols has been emphasized by logical empiricists, but this so-called axiomatic treatment of any subject has many advocates in other fields. Hilbert in mathematics along with Peano, Whitehead and Russell are representative. Kolmogorov in statistics, Hempel and Margenau in physics, Papandreou, Arrow and others in economics, Bavelas, Haire, Hull, Guilford in psychology, Lazarsfeld, Lerner and others in sociology make use of similar methods. Mattessich and Chambers have been trying to bring the approach to the field of accounting. See R. J. Chambers, "Blueprint for a Theory of Accounting," Accounting Research, January, 1955, and "Detail for a Blueprint," The Accounting Review, April, 1957. For Mattessich, see: "Towards a General and Axiomatic Foundation of Accountancy with an Introduction to the Matrix Formulation of Accounting Systems," Accounting Research, October, 1957, "The Constellation of Accountancy and Economics," The Accounting Review, October, 1956, and in the same journal "Mathematical Models in Business Accounting," July, 1958.

[19] "If Σ is an axiom system, then an interpretation of Σ is the assignment of meanings to the undefined technical terms of Σ in such a way that the axioms become true statements for all values of the vari-

or the assignment of empirical meaning to symbols "semantics," and they have tried to develop a rigorous approach to this area. Mathematics consists only of symbols and some sort of rules for manipulating the symbols, and accordingly has no relation to the world of experience. Geometry, for example, is completely abstract until interpretations of some kind are made to relate it to what we think of as triangles, circles and other products of our senses.

The first reactions of such practical people as accountants are likely to range from disinterest to mild resentment but as Wilder points out:

> It reduces mathematics to a strictly "formal" process, with no direct reference to any "real" interpretation of the symbols involved. It has the advantages that accrue from avoiding errors due to varied interpretations of terms or unsuitable connotations, such as are frequently made in the use of ordinary language...[20]

---

ables....As a rule, we shall use the word 'model' to denote the result of the assignment of meanings to the undefined terms." Raymond L. Wilder, Introduction to The Foundations of Mathematics (New York: John Wiley & Sons, Inc., 1952), pp. 24-25. The separation of the calculus from the interpretation is emphasized by Andreas G. Papandreou: "...one could start with a calculus (any calculus) and attempt to give it an interpretation (i.e., assign meaning to the symbols) which would turn it into a deductive system." Economics as a Science (New York: J.B. Lippincott Company, 1958), p. 14. This remark by Alfred Tarski should keep us from over-emphasizing the separation: "In contemporary methodology we investigate deductive theories as wholes as well as the sentences which constitute them, we consider the symbols and expressions of which these sentences are composed, properties and set of expressions and the sentences...and even relations between expressions and the things which the expressions talk about..." Introduction to Logic (New York: Oxford University Press, 1941), pp. 138-139. Each of these references is a very good source of information for those wishing an introduction to axiomatic method and symbolic systems. Another general discussion may be found in Patrick Suppes, Introduction to Logic (Princeton: D. Van Nostrand Company, Inc., 1957). For a more sophisticated approach with discussions of meta-languages, see Rudolf Carnap, Introduction to Symbolic Logic and Its Applications (New York: Dover Publications, Inc., 1958). Most non-specialists, such as accountants, will profit greatly from Charles W. Morris, "Foundations of the Theory of Signs," International Encyclopedia of Unified Science (Chicago: University of Chicago Press, 1955).

[20] Raymond Wilder, op. cit., p. 200. Richard Mattessich gives more detail. "It introduces great generality, which produces highly economical working...as well as in the setting up of accounting models.... It liberates the structure from the facade....It opens new perspectives ....Features which have been hidden behind the technical language...are revealed by the much more general and fundamental language of mathematics.

It should be clear that theorems proved in the more general calculus may be carried over and applied validly in all proper interpretations. An economy of effort may result, and the help of specialists in proving such theorems may be used by those who are in the applied fields and are less adept at abstract proofs. Such a division clearly helps the cause of specialization yet in a paradoxical manner yields more generality. The fundamental calculus permits use of developments in other fields and, in fact, makes it easier for those in related fields to understand the specialized jargon of another. Thus a mathematician may understand more quickly and perhaps be able to make substantive contributions to accounting if the latter is approached as an interpretation of a set of abstract axioms.

Recently there has been a movement--led by some remaining member of the Vienna Circle--toward the unity of all sciences, and the results so far have been two volumes of the *International Encyclopedia of Unified Science*. The idea of the unity of science seems to be akin to such adventures as the search for the fundamental substance of matter, life or thought. The unifying structure is, of course, language under the title of Semiotic and slightly broadened from the narrow concept of language. The partitioning of any science or investigation into the formal (calculus) portion and the interpretation forms a starting point. The concept of language is expanded and classified so that the formal part is syntax (logic), the relation of the signs to experi~~mental~~ential objects is "semantics," and the behavioral influence is "pragmatics." The language of science then becomes a generalized theory of signs including their designata and their relations with the folks who use them.[21]

We will not be concerned more with this subject at this point. An essay on the elementary aspects of semantics is included in this group, and another essay on logic and scientific method is included. While no essay on pragmatics is available, the relationship of this area to behavioral psychology and therefore to the essay on some behavioral aspects of accounting should be clear. It is hoped that these essays will indicate the extent of scientific method employed by accountants.

It brings a more rigorous order into what some call 'the art of ordering' ....It may facilitate the translation of concepts of one branch of accountancy into the concepts of another branch..." "Towards a General and Axiomatic Foundation of Accountancy," *op. cit.*, pp. 329-330. It forces most of the psychological vagaries into the area of interpretation (semantics) and thereby banishes most psychological ambiguities from logic, i.e. the syntactical area.

[21] The most comprehensive, easily digested treatment is by Charles W. Morris. "Foundations of the Theory of Signs," in the *International Encyclopedia of Unified Science*, *op. cit.*, pp. 77-137.

Holistic and Atomistic Views

A well-known controversy arises with regard to the organizing principle for investigation in accounting. The reduction principle is usually associated with the view that a field or subject can be completely explained without remainder by explaining its constitutive parts. The opposing view assumes that the organism has properties not assignable to its parts and is known as the organic or holistic approach. Moreover, it is argued that peculiar properties are conferred on the parts by their relationship to one another and to the whole as a functioning organism.[22] The reductive approach was apparently aimed at freeing investigation from animistic remnants that hampered physicists for centuries, but when human beings are involved we are faced with adaptive behavior in the form of purpose. An instrumentalist approach that tries to describe and evaluate each part with reference to its contribution to the objectives of the entire organism is certainly inescapable. The organic (holistic) scientist studies the parts but insists that the whole is not entirely explained by this limited study, and, as Schwab emphasizes, the properties of the parts are treated as if they were conferred by their place in the organization. He adds: "...biologists and psychologists adherent to...anti-principles have an extremely hard time being faithful. The word and the notion of function creep in time and again, so does 'teleology' in the guise of 'drive,' 'anticipation,' 'adaptive value,' 'operant behavior'."[23] It is also interesting to note that the growth of cybernetics with the emphasis on objectives and negative feedback has given some impetus to the holistic and teleologic movement.

For one who uses a causal approach to science these ends or goals function as causes in the thinking process. Braithwaite, for example, points out their similarity to Aristotle's final causes functioning as immediate causes, and suggests that those who use the holistic approach postulate the goal-striving property to the organism.[24]

---

[22] A number of ecnomists adopt opposing views on this matter. "As Koopmans points out, a full characterization of each individual's behavior logically implies a knowledge of group behavior; there is nothing left out. The rejection of the organism approach to social problems has been a fairly complete, and to my mind, salutary rejection of mysticism." Kenneth Arrow, "Mathematical Models in the Social Sciences," The Policy Sciences (Palo Alto: Stanford University Press, 1951), p. 133. But see Rutldge Vining: "...in a positive sense the aggregate has an existence over and above...individual units and behavior characteristics that may not be deducible from the behavior of these component parts." "Koopmans on the Choice of Variables to be Studied and of Methods of Measurement," The Review of Economics and Statistics, XXXI (1949), pp. 77-86.

[23] Joseph J. Schwab, "What do Scientists Do?" Behavioral Science, V (January, 1960), p. 6.

[24] "...writers...agree in postulating something in the organism which is present whenever goal-directed behavior is taking place and

The use of "to postulate" in this connection may be misleading and perhaps unfair to one committed to operationism. If the fruits of observation and theory formation indicate that the behavior of the parts can be predicted with the required degree of certainty by reference to such a theoretical construct as goal striving, operant behavior or other forms of organic behavior, we may use the construct in our investigations and explanations on a tentative basis until subsequent evidence makes it usefulness doubtful. The term 'postulate' may give the impression that such constructs and constitutive relations are made up at will and are therefore arbitrary.

With the use of goal-striving, objectives, ends, drives, etc., as theoretical constructs operationists are not concerned with the old debate as to whether future explanations must be entirely in physico-chemical terms. All they need to assert is that there are uniformities in the observed system and that the particular theoretical construct helps predict the future state of the system.

To some extent the holistic-atomistic controversy arises from poor definitions and bad verbalization. The difference tends to disappear as the parts are more carefully described and defined. A broad view describes the individual notes and related symbols in a musical composition, for example, by a number of their properties and relationships. Among these defining properties is the position of the part with respect to other parts and its relationship to them. To explicate a part without considerating how it functions in its environment--relates to all sorts of other parts--is to over-apply the rules of abstraction and shear off properties and relations that are in fact important. Now it is clear that a complete description of the environment--all possible properties and relations--would be a description of the totality of our experiences and more! This problem also arises in connection with causation. If the view is broad enough, everything may be the cause of everything else. Thus we must construct a gap between the system and its environment and limit the forces that we let impinge on it. Usually we limit the bounds of the organism and its objectives, and then abstract from those properties and relationships that are not related to the desired context.

This controversy over the holistic and atomic approaches has implications for the accounting profession. The entity-organizaton-problem may be viewed as an area of interest, but within such an area there are usually many sub-groups whose interests may be related but may also be in sharp conflict with the interests of other groups in the organization. We must remember that the entire concept of organizational objectives is highly abstract and is, in fact, a type of reification. However behavior attributed to organizations does exhibit certain patterns, and these patterns may be studied and predicted. We are certainly able to study patterns for individuals within the organization and to appraise the resultant influence of each.

---

which is to explain it in the ordinary causal way..." R. B. Braithwaite, Scientific Explanation (New York: Harper & Brothers, 1960), p. 326.

It appears that accountants are forced to use methods of observation and measurement that are both aggregative and distributive. At times they try to estimate future income for the organization as a whole. More often they try to relate expected revenues and expenses to parts of the firm and to aggregate the individual streams. The rate of future expenditures, for example, can often be estimated best by referring to specific asset replacements necessary to preserve the revenue stream. Accountants operate in both directions, and one of the most difficult tasks is to find a basis for distributing an expected stream of favorable circumstances to individual assets. They do impute contributions on a more or less incremental basis to decisions, but, as it emphasized later, they then tend to impute excess contributions over cost of implementation to the general organizational environment. The usual procedure therefore uses an incremental approach that imputes all the increase to the specific event or decision and none to the remainder of the organization when the decision is being considered. After a decision has been made, however, the accounting procedure assigns benefit equal only to implementation costs to the specific assets or decisions and assigns the excess (if any) to the organization. This strange set of rules is responsible for considerable misunderstanding among both accountants and non-accountants.

Criteria for Rule Selection

Philosophical and theoretical inquiry usually attempts to find general relationships, definitions and sentences. This statement needs special emphasis in the accounting field and in any similar field that grows up piecemeal and in answer to all sorts of demands for specialized information. The result in current professional jargon is a profession of numerous partially integrated rules that have been adopted to meet all kinds of "brush fires"--i.e., specific points pressing for immediate "answers." Accountants sometimes argue such theoretical points as direct costing versus full costing, current costing versus replacement depreciation without establishing any general criteria for assessing superiority or any standards for judgment. The arguments are often far too long, too loud, and too indecisive. Surely, there is enough in common in the problems of an information service such as accounting to permit generalizations and establish standards to which individual techniques and procedures should conform.

An adequate theorist from a field with any philosophical maturity should be able to give guidance and suggest answers to questions such as the following. What should be our criteria for preferring rule collection A over rule collection B? How are such criteria of superiority derived and judged? The standards for judging the adequacy, consistency and adaptability of individual rules and collections of rules are considered to be more general than the individual rules and situations. The search for generality is a major part of philosophical and scientific inquiry, and a science is considered to be well developed if its individual problems and situations can be "explained by" (shown to be consistent with) a relatively few general propositions.

We assume a preference for rules that have clear-cut operational instructions for applying them to the sensible world. Preference is presumed for rich interpretations with "rules of correspondence" that are easy to follow and apply. Second, we feel that superior rules should lead to results that tend to encourage progress in goal-seeking activities toward worthy objectives.

Criteria for superiority are subjective standards of worthiness and are therefore value judgments. These assessments of worth are not controlled directly by logic and cannot be settled by appeal to some sort of logical or scientific court. Logic and scientific method help us observe relevant data, search the resulting experiences for uniformities, objectives, etc., with a clearer insight. But what is accepted as desirable behavior for members of a profession--or indeed by a member of any society--is the result of subjective evaluation by individuals and especially by leaders of the group. In later essays it is argued that standards for such evaluations are conditioned by the ideology in which they operate. While ethical and esthetic values may be studied by logical and scientific methods, they themselves are not logical propositions and are not scientifically determined.[25]

In the following essay we will discuss some of the criteria for an effective information-control system. Society has granted members of the accounting profession the responsibility for furnishing useful and dependable reports covering important segments of human activity. How do we sense ("read") the extent of society's commission and how do we go about discharging our commission? Shall we let governmental agencies determine the ethical framework and operate our profession under the price system? Do members of the profession have special obligations for integrity and truthfulness and for helping maintain equity among contending groups in society? These are questions that should concern the accounting theorist as well as the social philosopher.

---

[25] This view is counter to that held by some positivists. "...the final ends of all personal conduct are provided by man's inherited desires or drives (his instincts), and therefore all problems of conduct are scientific problems....The problem of what end is ethical is meaningless since no method of verifying any solution of it is conceivable." Burnham Putnam Beckwith, Marginal-Cost Price-Output Control (New York: Columbia University Press, 1955), pp. 11-12. However, our view is not necessarily opposed to the view held by those with "outer direction." Outer direction may or may not be influential in shaping the ideology, e.g., the standards and mores of society.

COMMENTS ON ACCOUNTING AND ITS ENVIRONMENT

The thesis expressed in this essay is that the foundations upon which specific doctrines of accounting rest are inferences and assumptions related to the needs of goal-striving individuals. Thus it is argued that any theory of accounting depends for its validity on propositions in the broad area of human needs and human behavior and that any statement of accounting theory must be derivable from this more general set of relationships and propositions. Theory is often considered to be the entire complex of logical rules, primitive terms, semantic rules of correspondence, interpretations, definitions, theorems, etc., necessary to explain (Put the inquiring mind to rest,) behavioral or physical observations. In this spirit the position expressed here is that the definitional boundaries of the profession are relatively unimportant except for establishing lines of professional jurisdiction. The important boundary, from the point of view of methodology, seems to be between the symbolic apparatus and the statements that tie this apparatus to the data of the empirical world. It is argued, therefore, that the important and critical boundary tends to separate the psychological features of human beings striving for their goals and attempting to satisfy their needs from the more conventional apparatus of logic and mathematics. According to this view, the generalizations of accounting must be subjected to the discipline of logic and scientific method, but in addition they must be deducible from more inclusive generalizations from the fields of individual and group behavior.

If accounting principles are rules derived from behavioral and social generalizations, then their usefulness and their consistency must be appraised in the broader context of goal-striving activities and socially worthy ends. Their derivability is thus the result of applying acceptable logical and empirical procedures to broad social objectives in order to establish desirable rules for the more limited activities of gathering, classifying and reporting certain kinds of data. The machinery for investigating and appraising accounting principles, then, is related to finding whether the accounting rules are consistent with (harmonize with) those broader principles. This use of 'consistent with' is related to the use of the term in logic but is applied here primarily to determine whether certain accounting rules tend to accomplish acceptable goals - facilitate action toward desirable ends. The methodology of accounting therefore includes procedures and devices for appraising and evaluating worthy ends, for isolating and encouraging acceptable means of accomplishing such ends, and for establishing the routines necessary to adjust the two and permit enough flexibility to meet changing technologies and

shifting social objectives.[1]

It is usually a thankless task to prepare a series of statements that are considered to be basic in any sense for a profession or branch of learning. Such lists are at best pretentious and are subject to criticism at practically every stage. The following list is accompanied by the feeling that the individual statements are far too loose and unsophisticated, but is presented to emphasize some presuppositions that require attention before we are able to discuss the more familiar topics such as debit and credit. It should be observed that these statements are 'interpretations' and are at the semantic level in the sense that they refer to the relationship of the observer to the empirical world. Many readers may wish to prepare their own lists and may wish to begin with statements about acceptable forms of logic and acceptable rules of transformation and inference. For the benefit of the "metaphysicians of pragmatism" it should be emphasized that the following statements presume a succession of experiences, the ability of the observer to correlate these experiences, to arrange them in some sort of order, and to develop uniformities among them. Thus the unstated primordial methaphysical ooze assumes an entity with the ability to have experiences and to discriminate and classify them. For ordinary purposes we make the usual assumptions of science including the assumption of observers and external data, but these assumption are not necessary.

The following list attempts to avoid substantive material and to concentrate on some useful assumptions for establishing a methodology for accounting.

Some Underlying Observations and Generalizations

1. We are able to organize our experiences so that we can discriminate entities and separate them from other entities and from their environment.

2. We can observe the experiences assigned to these entities - their behavior.

3. We observe uniformities (patterns) in behavior, and we propose an explanation, i.e., we infer goal-seeking activities, purposive and adaptive behavior.

---

[1] Thus the following statement by J. F. Blair in his excellent article: "In Quest of an Audit Principle," seems to be overly restrictive. "It is uniformity of purpose we are seeking, not uniformity of practice - that is uniformity of ends, not of means." *The Journal of Accountancy*, February, 1947, p. 118. A.C. Littleton quotes this statement with approval and makes perhaps his own greatest contribution by discussing the adaptation of feasible means to accomplish desirable ends. See *Structure of Accounting Theory* (American Accounting Association, 1953), pp. 176 ff. *et.passim.*

4. We can infer from common behavior that some goals are considered to be more desirable than others, and we are able to weigh this evidence and to rank the relative strength of these goals.

5. We can infer from action of the entities the kind of information reports that stimulate them toward objectives and which deter them.

6. We can observe the adaptability of these entities and infer that it is possible to "educate" them to use different kinds of information.

7. We can devise procedures and schemes to help them accomplish desirable objectives.

8. Information is not always costless in terms of other objectives that must be sacrificed in order to procure it.

9. Some entities have preference scales.

10. These entities develop procedures and methods of selecting and reporting relevant information. (This procedure is derived by identifying the goals and purposes and feeding back the objectives as causes of activities. This feedback helps determine consistency of actions of participants, explain behavior and predict it. These rules and procedures consist primarily of identification, observation and measurement rules for furthering goal-seeking activity.)

11. These methods, procedures and rules are rated on a preference scale such that: Set of rules A is preferable to Set B if one of the following is true. Set A involves less sacrifice and yields identical benefits: Set A involves same sacrifice but yields more benefits: Set A involves more sacrifice but the added expected value of benefits is greater than the incremental sacrifice.

Event - Recognition Rules and Entity Selection

It should be emphasized that the above statements are extremely general and may be applied to disciplines other than accounting. It is the intention now to set forth a number of tentative statements that might serve as a framework for accounting as it is usually conceived and defined.

We could begin such a series of statements by assuming some sort of fundamental flow or some kind of fundamental rights and attempt to build the accounting structure on this foundation.[2] The difficulty with

---

[2] I am unable to build a satisfactory structure on such primitive terms. Richard Mattessich has made an important contribution by considering a series of events to be a "flow" and with the help of some axioms, definitions and requirements build an axiomatic structure for accounting. From our viewpoint he (continued on the following page)

with such a beginning is that it gives no guides for determining what events should be recorded and which events should be neglected.

Our first problem seems to be to select from the more general social disciplines an area of interest and need - an entity. The selection of an entity is one of the more primitive accounting notions that involves: (a) recognition that certain individuals have worthy objectives; (b) that their progress toward these socially desirable ends require adaptive behavior with some choice as to both means and ends; (c) that these choices may be improved by certain information. The objectives may be diverse. Simple scorekeeping may suffice if the objective is to determine the winner of an athletic contest. If it is desirable to predict future winners and to improve performance, we may wish historical records of individual accomplishment in batting, pitching, fielding, throwing, etc. In such cases, as in most others, a number of entities - areas of interest - are interwoven. Records of achievement to be compared with objectives may be accumulated (accounted for) for individual players under varying conditions, individual groups of players e.g., pitchers, left-hand batters, and for the entire team or for the entire league. The reader may or may not wish to exclude such information services from his definition of accounting, but many problems are common to both. Objectives are specified. Activities required to accomplish these objectives are identified. Convenient measures of performance of these activities are assigned. These measures are applied to those who are responsible for the activities and have some degree of control over them. The information is then gathered, summarized, and reported so that it should help attain objectives more effectively.

Clearly specifying and ranking objectives may be a major problem in some types of accounting. In some cases the task may seem relatively easy, and a few reports may suffice. In most cases, we may need a large number of progress reports that range from salesmen's records, product-sales records, production records, efficiency and cost reports and liquidity statements. The objectives in some of these instances may be so complex and interrelated that the establishment of numerous intermediate and sub-objectives in the forms of standards, quotas and potentials may be desirable. Progress toward these targets may then be accounted for and reported. In the meantime the profession must be concerned with harmony of the sub-objectives among themselves and with more general goals.

In the operations of even a simple organization there are many events that do not seem to be relevant to immediate objectives. Cost considerations mean that we cannot record every event that impinges on the organization, and we must accordingly make a selection. This selection of events to be recorded is a matter of assigning subjective utilities and

---

should have begun with objectives, and proceeded to needs, and then to events. See Richard Mattessich, "Towards a General and Axiomatic Foundation of Accountancy, With an Introduction to the Matrix Formulation of Accounting Systems," Accounting Research, October, 1957, pp. 328-355.

estimating probabilities. The fact that a ball player frequents bars at all hours of the night is a material piece of information that should call for measuring and reporting unless we may assume that the effects are reflected in some other measure of his accomplishment and capability. In a similar manner the senility of a corporate president would seem to be an event (or series of events) of importance to at least some other members of the organization. Perhaps the effects of this turn of events will show up elsewhere in the reports with less direct reference. If so, our problem becomes that of choosing which means of disclosure yields the largest probable advantage.

The problem of finding rules for determining which events require recognition (and when) is a major problem of accounting. What we obviously try to do is to recognize those events relevant to objectives. In some cases we fall short of the mark when we apply definite rules of procedure. That is to say, our selection of operational rules is sometimes faulty even if we are lucky or astute enough to identify and appraise objectives and probable behavioral reactions correctly.

The selection of rules for determining which events will be relevant to objectives and to future decisions is a difficult task, but it is precisely at this level that real progress may be made by those interested in improving the practical operation of accounting. We are faced with evaluating the probable effects of such events as wars, revolutions, price-level changes, new products, technological advances, changes in management ability of competing firms, conflict of interest among our own managers, changes in the general liquidity of the economy, new tax policies, along with other internal events such as increasing conservatism of our management, inability of salesmen to adjust to changing times, inflexibility of our engineers, etc.

There is a cost [sacrifice] attached to extending our recognition rules to more and more events. The evaluation problem becomes more difficult, and the probability estimates become more diverse. The accountants' competence becomes more limited. The point to be emphasized is that critical examination and appraisal of the event-admission rules is a proper subject for investigation by accounting theorists. We may wish to argue such accounting problems as the price-level problem, but we should fit the arguments into the broader background by specifying exactly which objectives are involved, and exactly what decisions will be influenced, and identify precisely the individuals who make the decisions and hope to attain the objectives. Only then can we explore possible influences of available alternatives and experiment with competing recognition and reporting rules. Clearly, (as Professor Sorter points out) there is something wrong with an information-control system that insists on recognizing the exchange of a dime for a lead pencil and is silent about unfilled orders, expansion plans and the state of the industry.

Our task is not completed, by any means, when we adopt acceptable event-admission rules that give consideration to objectives, alternative information schemes, and cost. But at least we have completed a number of steps and have a basis for continuing. Our next step is concerned with determining which aspects of the events will be measured and reported.

What dimensions shall we recognize? And how many? In accumulating pitching records we may wish to recognize wildness, ability to work long stretches (complete games), ability to work long and often (innings pitched), deceptiveness (strikeouts), ability to win (won-and-lost records), and to provide a basis for judging remaining years of effectiveness (age and trend of performance). Many may wonder if accountants do as well for their clients.

To the extent that the enterprise objective is that of a bailor we may devise a set of rules that admits events which are concerned with accepting responsibility for objects and with release from such responsibility. The objectives are clear; the event-admission rules are clear; and the dimensions are clear. But suppose we wish to recognize some damage that may occur. Clearly an expansion of the instructions is necessary to locate responsibility and to measure the deterioration.

Consider now the steward who is given a collection of properties along with a charge which includes in its provisions (a) increase the fund by operations if possible; (b) keep track of the claimants to the fund and their rights; (c) exercise freedom in the composition of the items of the fund but preserve enough liquidity so that control is not lost; (d) be kind to workers and pay them at least the current wage rate; (e) make products that are reliable and yield customer satisfaction; (f) keep the properties in such good physical shape that they will add to the beauty and dignity of the community; (g) keep the organization operating, and (h) support good works generally, take part in civil affairs, and operate in harmony with accepted social standards.

A little reflection on typical managerial responsibilities indicates that we accountants have taken an extremely limited attitude regarding our task of furnishing useful, dependable information. In fact we have permitted large parts of our domain to go by default to others. What reports do we render of "good works?" Participation in civil affairs? Wage obligations? Customer satisfaction? Obviously there is more to accountability than finding acceptable rules for measuring the amount of profit earned, and there are more objectives than profit maximization and survival.[3]

It is interesting to note that much information is given more or less outside the narrow double-entry system by judicious classification and arrangement. Some index of customer satisfaction is given by the amount of returns and allowances and in fact by the volume of sales itself. The degree of liquidity is indicated in a crude way by classification (grouping) and by presentation in statements. The condiditon

---

[3] Those who follow Luther and accept the protestant ethic will no doubt feel that the presence of profits and increasing wealth reflect the reward of God for generally doing "good works." Whether our current measures of income and wealth are acceptable measures of Christian behavior is debatable. Certainly the conclusion that large accounting profits inevitably imply commendable social and moral behavior is not warranted.

of the properties may sometimes be inferred from the volume of maintenance expenditures, capital expenditures and book value related to original cost. So far we have done a poor job of reporting esthetic values.

The charge to do good works, be socially and morally worthy, and be public-spirited citizens has not been carefully measured and reported by accountants. Some indication of the contributions to worthy causes may be found in appropriate accounts, and the contributions to taxing agents is sometimes set forth. The contribution of the firm by allowing executives "time off" for public affairs is ordinarily not isolated. And the contributions of employees on their own time is usually chronicled in such auxiliary reporting devices as presidents' reports, house organs, etc. Our conclusion should be obvious: Accountants must develop selection rules for the objectives themselves as well as for individual events.

Events and Values.

The discussion in the preceding section emphasizes that accountants must be selective in determining which events are to be measured and recorded. The criteria for recognition are related to objectives. Objectives may be diverse and some events may affect more than one objective. It is the contention of this section that the usual concept of value (with some modification) is a sort of common denominator applicable to many diverse objectives and that the value construct (in some form or other) is an essential part of accounting.

In establishing an order among various constructs we maintain that objectives come first and are the guiding beacons for event admission and measurement. The concept of value is related to expected favorable prospects and is of course, highly subjective. Value therefore is related to objectives, for favorable prospects are not definable except in terms of "matters of concern," and 'worth' is definable only in ability to further objectives. Valuation then turns out to offer a framework for assigning subjective utilities to different conditions i.e., to sources of objective-fulfilling potential. The construct is concerned with favorable prospects and 'favorable' is related to objective-attaining potential. This relationship is emphasized because some accountants have apparently felt that value determination in some way is an ultimate of accounting If valuation and accounting for values are designed to serve as a medium for reducing objective-potential to a common denominator, it seems that such values must be internal in the sense of being subjective assessments. We ask then what do market values, costs, etc., have to do with our problem. To toss off glib references to profit maximization as the single objective of a composite organization may lead to a dismal measuring service. We need to do some thinking about weighing and harmonizing the goals of different individuals acting alone, in groups and sub-groups. Still it is possible that the economist's crude external market value construct and the accountant's crude measurement rules will provide an acceptable approximation for defining and weighing objectives.

The problem of subjective values is itself difficult enough and it is complicated further by the necessity for weighing interpersonal considerations arising from the interaction of different individuals and groups within the entity. Our method of procedure here is similar to that employed by measuring specialists everywhere: we simplify the problem by searching for related constructs until finally we can substitute one with approximately the same meaning that can be identified, classified and measured. A considerable part of accounting and economic controversy is concerned with whether simplified models are close enough to be useful in reaching decisions. This activity is legitimate theory in the sense that it is concerned with whether the rules of correspondence do or do not define the mental constructs that we wish to measure and relate to our objectives. 'Market value' may not be quite the phenomenon we wish to use, but perhaps it can be substituted for a more complex construct. The rules for measuring market value may be relatively simple, and the substitution may be acceptable. In a similar fashion cost to an entity is sometimes more easily handled than subjective value to the entity, and is usually substituted. A legitimate theoretical activity therefore is concerned with whether "cost" as identified and measured by rules adopted by the accountant can be substituted with profit for the kind of value constructs that are appropriate for making decisions and meeting objectives. The historical - aboriginal - replacement - alternative - current - purchasing power discussion of cost should be judged against this broader framework. Notice that agreement is not a necessary condition for theory. Equally honest individuals may appraise needs and means in different ways and assign different weights.

Let us return to the problem of deciding which events are to be admitted and which omitted by constructing a crude analogy. The status of an entity in relation to the objectives of its members at any point of time may be represented by a panorama of hills and mountains of favorable prospects (goal-satisfying potential) along with depressions for unfavorable prospects. Some of these favorable hills arising above the wasteland we agree to recognize, measure (evaluate) and report as assets. Other favorable circumstances (e.g., morale) may indeed rise as high as some of the buildings, but accountants have agreed, for some obscure set of reasons, not to treat them as assets. We need to examine these rules for determining which service potentials should be recognized and which omitted. We also need to scrutinize the additional rules for reducing these mounds of favorable prospects (and sloughs) to common denominators and for measuring their elevations and depressions.

We could examine whether a report that nets the prospects (gives the algebraic total) would be adequate, but the usefulness of classification for suggesting additional dimensions is apparent. Accountants usually assume that indicating the type (source) of service potential, e.g., shelter, is useful. Some degree of liquidity is usually necessary for attaining objectives, and the accountant's procedures in this area need review. Our accepted methods disclose liquidity features by classification or by refusing to recognize an increase in favorable prospects unless it is accompanied by additional liquidity - realization. Perhaps we should try to scale liquidity directly into our value system instead of building it on a go-no-go basis into our definition of realized income.

Let us now turn to an examination of some rules for value recognition that are currently in use and comment briefly on measurement devices and assumptions. These instructions are not always clearcut, and they are sometimes difficult to apply. Favorable situations that are common to all firms, such as good mountain air or stable governments are usually considered to be a general rise in the plateau not subject to measurement and treatment as assets. In other cases, such as a donated factory, the donation may appear to be a mound worth capitalizing, but the attendant low lands of unfavorable wage efficiency, high transportation costs etc., may mean that the gift has no substantial overall potential. In some cases the expected favorable circumstances must be differential in the sense that they are peculiar to the specific organization. Yet this test is not often applied, and we find buildings being treated as assets even though all competitors also have shelter. In these cases we usually explain the position by pointing out that past effort in order to build mounds may somehow be relevant to the future and be traced as the sacrifice in attaining desirable points of vantage.[4]

Measurement rules and models are discussed in later essays. At this point we point out that 'assets' are defined by accountants to include differential advantages that are related to potential to attain objectives. Thus the asset value to the members of an entity (e.g., recluses) may be different from the market value determined by marginal buyers and sellers in an external market. A very real difficulty that will concern us later is the process of finding an acceptable common denominator for all kinds of different potentials for satisfying all sorts of objectives and goals. In some cases large sales may be a higher ranked objective than large profits, and a monumental and impressive factory building may be more important than either. Power to dominate

---

[4] C. West Churchman has concerned himself with assets and has tended to relate them to power. "The concept power can be defined several ways within the means-end scheme...we may say that the power of an individual X is simply the measure of his ability to attain any one of a set of his desired goals....This definition of power implies that the power of an individual depends on the choices he can make, on his state of knowledge, and on the goal he wants. Hence, one man may be more powerful than another because he wants less....Our interest here, however, is in a concept of power that is independent of the individual's specific goals. ... Although it may be possible to measure power in terms of potentiality of choice, we often find ourselves concentrating more on an individual's resources than on the actual choices themselves. This suggests a third definition of power. We shall call the resources assets, and define an asset as any aspect of an individual's environment that produces a potentiality of choice for a set of actions." Prediction and Optimal Decision (Englewood Cliffs, N.J., Prentice-Hall, Inc., 1961), pp. 323-324. Apparently Churchman refuses to admit that those "resources" which have no subjective goal-achieving potential are of concern or importance. To a recluse, money may be of no moment, not related to his objectives, and therefore not worth measuring. The potentiality for choice instead of potentiality for satisfaction seems to be an unnecessary restriction.

the industry or community is often a major goal. The extra cost of monumental buildings may be measured without difficulty, but clearly our measure of benefit in terms of sale of products leaves much to be desired. Indeed, the objective may itself be satiated quickly so that most of the benefits are received in a relatively short period. Thus we need to consider stability of goals for members of the entity and perhaps for society.

At last we may take a quick look at the bookkeeping phenomenon of double entry. Double-entry results from measuring two aspects of assets and adopting conventions and measurement rules that assure the equality of the numbers assigned to each aspect. We could just as well assign numbers to three qualities (properties) of events and have triple entry or n qualities and have n-tuple entry. Or we could devise related pairs and have double-entry doubled. One pair might be our usual asset and source of asset while another might be a liquidity measure matched with a responsibility for liquidity, and still another a measure of aesthethic values with equal credits to specific sources of such values.

These illustrations seem to be a little far fetched, but it should be observed that accountants are far from agreed on the meaning of the credit dimension. On the other hand they may be too well agreed and too insistent on the necessity for equality of assets and whatever other dimension is selected.

Some accountants hold to assets and sources of assets as the two dimensions worth recording; others use assets and claims or equities; some seem to prefer assets and responsibilities for administering the assets; one at least appears to follow assets with restrictions on managerial freedom in manipulating the assets as the second dimension. Chambers has abandoned asset values as the primary dimension. He has suggested outputs equal inputs plus residues.[5]

It is not intended to discuss the relative merits of each such formulation. Later discussions will argue that single-entry or even

---

[5] It is probably true that entity or fund theorists on the one hand may be distinguished from propietory theorists on the other by their preferred fundamental equation. It seems that the form of the equation is not a very fundamental mark of difference, i.e., there should be more important consequences of adopting these views. The degree of restriction in most cases is approximated by ordinal measurement, i.e., ranked classes without equal differences in restrictions. The approach of R.J. Chambers has interesting possibilities. "In the simplest case of a continuing entity inputs equal outputs plus residues....The equality may be called the basic identity or axiom of accounting. If it is granted that the relationship between inputs and outputs and the size of residues are matters of importance, double-entry follows. If some aspects of these matters are practically less important single-entry accounting may suffice. For the purpose of recording inputs and outputs a convention is adopted. Inputs will be shown as credits; outputs and residues as debits." "Blueprint for a Theory of Accounting," Accounting Research, January 1955, pp. 22, 23.

no-entry accounting may be adequate for certain information gathering and reporting. Nevertheless, a digression on some aspects of double-entry as a method follows as an informal appendix.

APPENDIX A TO ACCOUNTING AND ITS ENVIRONMENT

Exercise in Formulating Fundamental Accounting Equation. In uninterpreted symbolic form we may express what is generally known as the fundamental accounting equation as:

$$(z)\exists x\exists y[(N)x\;O\;(M)y]$$

In the usual jargon of logic this general equation may be read for every z there exists an x and there exists a y such that the property N assigned to x is always the relation O with the property M assigned to y. In order to develop this general statement for use in accounting we must interpret the symbols and make the operators more definite.

To begin the interpretation of this general statement we shall define z as any modification (event or transaction) that is worthy of recording. We have pointed out elsewhere that the establishment of a set of rules for determining which events in the empirical world are worthy of attention is a complicated matter that depends on objectives. The N and M may be interpreted as cardinal numbers assigned by measurement rules to x and to y, and the 'O' relation may be interpreted as the specific relation 'equal to.' Thus the later part of the expression asserts that the number assigned to x must be equal to the number assigned to y. When combined with (z), we assert the equality of x and y for every modification (event or transaction). The entity construct is an extension of the expression, 'for every z,' for the admission of any particular z into the collection requires the existence of class discrimination rules that together determine the boundaries of the entity. Now the formulation of such rules is not done automatically by some legerdemain of logic. These formulations are constructed with full attention to objectives and human needs.

The interpretation of x and y also relates directly to rules of correspondence that tie the symbolic letters to accounting concepts. These rules are not whimsical; they must be related to concepts and made operational. Thus, constructs may be related to other constructs containing intervening variables. We may interpret x to mean preferred states and interpret y to mean individuals who are able to enjoy these preferred states. Certainly the common interpretation assigns (favorable prospects) to x and 'source of prospects' or 'right to enjoy prospects' or perhaps 'responsibility for administering prospects' to y.

In turns out that the concept of 'preferred states' is highly abstract and requires simplifying rules of measurement. The first level of simplification is to replace the diverse 'preferred states' with 'value,' a common denominator. By specifying only certain kinds of value, and calling the collection of specified values, 'assets' we may interpret x as asset and y as source or responsibility for asset.

So far we have made no interpretation in terms of debits and credits. By specifying a suitable set of rules of correspendence between assets (and sources) on the one hand with debit and credit on the other we can interpret the expression $(z)(\exists x)(\exists y)[(N)x = (M)y]$ to mean that for every recordable transaction (z) there exist at least one debit and at least one credit and the numbers assigned to debits must equal the numbers assigned to credits. The serious student should understand that it is possible to construct rules (conventions for assigning numbers) in which debits need not equal credits. For example, we might define debits as increases in either assets or sources of assets and credits as being decreases in either. The equality between assets and sources of assets could still hold, but the equality between debits and credits would not follow. Debit and credit are not identical to increase and decrease.

The interpretation in terms of debits and credits requires definitions of the verbal expressions 'debit' and 'credit'. These definitions may be constitutive definitions in the sense that they are defined in terms of other constructs such as assets, expenses, etc., or the definitions may be operational in the sense of giving instructions for identifying and using debits and credits, or they may be combinations of both. The latter case is clearly applicable. In the early stages of professional development definitions were developed for "account" and for "balance," and, with the ordinary usage of left and right, rules were developed such that debits are equal to credits. Thus, if an instance arises in practice in which the equality is not preserved, the lack of equality is attributed to the failure to follow the specified rules. When these rules are constructed to preserve equality of debits and credits it is necessary to specify that assets and responsibility for assets have opposite balances. Which side is to represent which aspect is clearly conventional.

A further interpretation is required if we wish to subdivide the assets and their sources. First, rules must be given for making such classifications and deciding whether a particular instance is or is not a member of each specified class. These rules and their formation are exercises in practical pragmatics and must consider the reactions of humans and machines to data and their ability to discriminate and classify data. The rules of deductive logic may be applied to extend the rules to classes and aggregates.

Observe that in making the interpretation of $(N)x\ 0\ (N)y$ it was specified that the numbers to be assigned must be equal. This is not quite the same as specifying that only increases and decreases should be recorded. The case of increase and decrease of the same class on the same transaction z is usually trivial, and may be allowed to remain or may be ruled out by a more limited interpretation of z, e.g., a transaction or recordable modification.

Notice that a good part of accounting theory, as commonly understood turns on the interpretation of recognizable transaction (z), for z might be given such interpretations as degree of blueness, or degree of hardness, or degree of favoritism toward church activities instead of the usual subjective concept of favorable expectations. It should be clear that many difficult problems that face accountants and constitute ac-

counting theory are related to: (a) specifying the rules for recognizing recordable events. (This covers such practical activities as determining the entity and deciding what is important in the way of events and what is unimportant.); (b) specifying what dimensions (aspects) of the events should be recorded; (c) adapting measurement rules for each dimension; and (d) giving instructions for collecting, classifying and reporting these measurements. The usual bookkeeping rules for debit and credit are a relatively minor part of (c).

APPENDIX B TO ACCOUNTING AND ITS ENVIRONMENT

Defense for Historical aspects of Accounting

Accountants have often been accused of looking at the past instead of into the future, and they have tended to de-emphasize their close kinship with historians. Accounting information, it is argued, is always used for decisions that are made in the future about actions that will take place in the future. Unfortunately those who have been most critical have given no instructions and no procedures for observing the future --the criticisms have not been made operational.

An explanation (justification) of the accountant's position may begin with the statement that not even the most accomplished clairvoyants have ever learned anything from observing the future or by taking their clues for present action from the future. Extreme advocates of determinism and predestination seldom go so far as to argue that sources of present information are placed in one's future experiences in advance and are available to the mind before they take place. Some critics may insist that accountants should try to improve their approach by observing the "present" and using its events for guidance, for, it has been argued, only the present has "meaning." Any useful definition of the present gets involved with mathematical limits and intervals far too short for meaningful psychological spans of recognition. If the present is defined as a period long enough for cognition, enough past must be included to allow coordination with existing experience. An instruction "to scan the present" is not very helpful.

Accountants observe the past and record some of its events simply because the past is the only segment available for observation. An accountant is therefore a special kind of historian; he selects events from the history of an entity by applying selection rules; he then applies measurement conventions and traces the effects of these events in terms of objectives. The legitimate criticism is not that accountants are essentially historians. The legitimate objection is that the accountant's history is not relevant to the needs of those who must have information.

Isolated facts are of little interest to scientists, historians or other inquiring minds. The search is for uniformities in behavior and for possible patterns in such behavior. This extremely close relationship between science and history was emphasized by Karl Pearson, who long ago pointed out that science consisted of descriptions of the past plus faith that the descriptions will prove valid in the future. The faith that such relationships will recur corresponds to what philosophers know as induction---hypotheses about behavior in the future.

It is possible to observe relationships among events in the past without relating them explicitly to the future. Thus a static model may be set up from observed relationships and belief about such relationships, and changes can be inserted into the structural equations and parameters without explicit reference to time. Indirectly these models are related to the future for the purpose of their formation is usually to find what

should happen to the system if changes are introduced -- to find how it works. Economists recently have concerned themselves with dynamics. This emphasis deserves mention inasmuch as the position taken here is that all information is about the past and that all useful information must be relevant to the future. To the human mind all events and activities seem to take place in a medium of time so that the mere passage of time is sometimes advanced as an "explanation" of all things that change. Clearly to use time (or even history) as the sole independent variable carries aggregation to its fantastic limit and may take on anthropomorphic overtones. This is not to deny that many important investigations are concerned with the speed with which certain reactions occur and with ordering them as a prelude to assigning primitive causation. The entire purpose of examining the past for uniformities and relationships is to help with predictions about *events* in the future, and it goes without saying that precedence and persistence of relationships are of paramount importance. (Normally we predict probable events in the future and accept rather than predict that the "future" will appear. In fact, a concept of future devoid of events may be an impossible concept.)

How then are accountants, or anyone else, able *to look* into the future? Clearly no one looks into the future in any literal sense. What then are the specific instructions? One looks at uniformities in the past. One assigns probability distributions to their expected persistence. One may enlarge his relevant past experience by analogy -- a process that is also based on experience. Certainly there is no handy searchlight to be focussed on the future. It is as if one "looks" into the future by using mirrors pointed to the past. At best inductions (hypotheses about the events of the future) are based on faith in the continuity of past relationships. Fortunately for mankind many of these observed relationships have proved to be remarkably stable.

Consider once more the place of the recordkeeping function in modern social life. The function of keeping historical records -- records can only be of the past -- is to provide guides for future conduct. This is the function of history and of accounting, and it is the framework in which accounting and all other information services must operate. Once this purpose is understood, a framework can be constructed for developing an integrated accounting theory that includes a methodology for determining whether accounting hypotheses are consistent and which specific procedures are consistent with overall objectives. It turns out that the pertinent objection to accountants as historians is that they have sometimes concentrated on the wrong events -- written bad history -- by keeping records of events that are not helpful for making decisions and do not further accomplishment of desirable goals.

Accountants have in fact, been slow to recognize their kinship with historians and have sometimes denied the historical function of their work. Some kind of record of accomplishment related to planned objectives would seem to be an essential ingredient of any control system. How far into the past the accountant must look for relevant clues and how he must weigh the clues are vital questions. In some instances a series of samples at fifteen-minute intervals in combination with the usual Shewhart and related quality control apparatus may be sufficient. The

accounting profession must do more however. It should specify how it establishs its tolerances, and how many previous test results need to be preserved and appraised to indicate trends, seasonals and other relevant influences with sufficient accuracy.

In fact, we may argue that the planning function is meaningless and futile without an appraisal of past behavior and inferences about the projection of some of the patterns into the future. There is unfortunately a current tendency to call estimates based on past accounting information in the narrowest sense 'accounting estimates,' and to term estimates based less directly on the accounts 'engineering estimates' or 'managerial estimates.' Whence come the data and skills for making such non-accounting estimates? The answer, in the absence of miraculous disclosure - an unsatisfactory basis for most business judgments - is of course that they use history that is not recorded directly in accounting records. They may be eclectic and select from a number of historians, including accountants, but select they do and the selections are from the past! Hypotheses may be set up and tested, but how does one intuit the relevance of the hypothesis to the problem at hand? Furthermore, as soon as the hypothesis is confirmed or rejected it too becomes a part of the heritage from the past.

This somewhat extended discussion is given to emphasize that information about the historical past is imperative for control and is also imperative for planning. The separation of planning and control by some accountants is certainly over-drawn, for planning, by any definition, implies concern with the future course of events. In addition it implies that some aspects of the future are susceptible to influence and control or that reaction to them will offer opportunity for judgment and decision. In a similar manner it is future events, or reaction to assumed events, that are the objects of control. While it is impossible to learn from the future, it is equally impossible to control the past. (Unfortunately some accountants and historians have been able to distort it!)

It has been said that every generation rewrites history to conform with its own needs. History then is rewritten as needs change, i.e., available records are sifted, weighed and interpreted. Those records that remain offer the highest expected value for desirable future conduct.[6]

---

[6] Those interested in the problems and philosophy of history will find The Philosophy of History in Our Time an exciting and useful book. (Hans Meyerhoff edited the anthology published by Doubleday Anchor, 1959.) Accounting history is written in a framework of usefulness that constrains the writer no less than the Judeo-Christian religious framework or the rational framework of Hegel influenced historians to interpret events as clues to God's will or the rational spirit. Accountants unlike institutional economists would probably not identify their efforts with 'historicism': "The subject matter of history is human life in its to-

Footnote continued from preceding page:

tality and mutiplicity...." Instead accountants are probably nearer to Benedetto Croce: "...the past is dead except insofar as it is 'unified with an interest of the present life.'" (p. 44). Most accountants would also agree with Meyerhoff's description of John Dewey's attitude: "...historical statements are like statements in any other discourse that claim to be true....and, despite their reference to the past, they are subject to the same kind of 'logic' which we use in ordinary language or in science." Ibid., p. 162. The "sociology of knowledge" aspects of history are discussed in Essay 6. Meyerhoff (p. 57) summarizes this view with this brief quotation from José Ortega y Gasset: "Man, in a word, has no nature; what he has...is history."

ACCOUNTING PROFESSION - SIMULATION AND DESCRIPTION

An attempt is made in this essay to point out the critical decision points in the accounting profession and to set up a descriptive model of how ideas may be introduced into the structure, how they become a part of the theoretical machinery and how they may be discarded. Similar discussions could consider the inflow and outflow of manpower, the expansion of services, or the monetary receipts. These flows are to some extent interdependent, but in this study no attempt is made to quantify the structural equations or to do more than guess at the form of related parameters. Such work would normally be undertaken by the equivalent in our profession of econometricians and probably should follow the general approach employed in industrial dynamics by Jay Forrester and others.[1]

Recently there has been some discussion of an accounting court and the desirability of having definite semi-judicial machinery for resolving conflict, admitting new ideas to respectability, and rejecting obsolete notions.[2] Before we enter such a structure that cannot avoid the introduction of rigidity into the system, it may be useful to survey the accounting profession as it exists and to point out how the job of idea introduction is now being done.

The problem is complicated by the lack of sharp definitions for fundamental concepts such as idea and profession. For current purposes 'idea' is used as a title to indicate suggestions for additions, emendations, cancellations of procedures, objectives, methods or other similar components of the profession. Thus, the concept of the all-inclusive earnings report may be treated as an idea although its emergence is related to many others, and it itself is a complex bundle of more elementary ones. The constructof the profession is also not a simple one. A number of variables operating on the concept are only partially deter-

---

[1] See for example, Jay Forrester, "Industrial Dynamics, A Major Breakthrough for Decision Makers." Harvard Business Review, July - August 1958, pp. 37-66. See also: Industrial Dynamics (New York: McGraw-Hill Book Company, Inc., 1961).

[2] Leonard Spacek, "The Need for an Accounting Court," The Accounting Review, July, 1958. The opposing view is presented here by DR Scott, who remains the most under-rated philosopher of accounting. "The failure of accounts to adapt themselves to the changing needs of management was not due to a reactionary attitude on the part of accountants. Fundamentally, it was due to the fact that accounts have grown into the institutional framework of society. Over the centuries, business practice and the law have grown around the double-entry record. The social role played by accounting was such that it was freely ~~available for the~~

mined or not determined at all by other variables within the system -- they are more or less exogeneous. Others are endogenous in the sense that they appear to be (with the present state of knowledge) completely determined by forces considered to be within the system. This difference depends on where the definitional boundaries of the system are drawn, but such a distinction between endogenous and exogenous means that the number of unknowns usually exceed the number of equations so that the system is underdetermined.[3]

We shall begin by assuming that the profession is in existence at the time of the investigation so that one of the first steps is to determine the initial conditions and establish the relevant decision points so that prediction may be improved. It may be possible to establish the relationships in quantitative terms that will permit manipulation of the model to determine its reaction to controlled changes in variables and parameters. While the results are valid only for the model under consideration, a carefully constructed framework permits inference by analogy to the system itself so that new insights may be gained. Such an approach may suggest research to be undertaken in the actual system, or, if not, it may lead to useful results by introducing changes in the model that could not be introduced into the system except at high cost or by disrupting the system itself. In a profession, for example, it may be impossible to study the effects of certain changes without wholesale personnel changes -- a procedure that is hardly feasible.

---

available for the degree of experimentation which inevitably accompanied so radical an adjustment. A new technique [statistics] which had not yet become institutionalized lent itself readily to the process of experimentation." DR Scott, "The Influence of Statistics upon Accounting Technique and Theory," The Accounting Review, January, 1949, p. 83.

[3] This discussion is not intended to set forth a blueprint for a mathematical description or model. Such a form may take the traditional form used by econometricians. The additional unknowns represent exogenous variables that take the form of parameters to be assigned value in the particular model. The system also contains a host of structural parameters which are in the nature of undetermined constants. An alternate approach used by Forrester makes use of difference equations and tends to give approximate answers instead of analytic solutions. Intervals are short enough so that interdependence among variables during a particular interval may be neglected. The resulting equations require solution in an ordered cycle and are set up to show storage levels, rates of change in levels and some hybrid auxiliary equations which function as rate equations. The initial conditions and equations are fed into a computer and new levels are computed at the end of the short interval. The results become the initial conditions for the succeeding period. Supplementary models can be developed and integrated for personnel, funds, training lags, facilities, etc.

Setting forth initial conditions requires further attention, but at this point it is sufficient to accept the initial conditions as the state of the profession resulting from a "process of historical selectivity." A brief discussion of Darwinian social selectivity is given elsewhere, and it is sufficient here to point out that the existence of a procedure is itself evidence that it met social needs more or less satisfactorily at one time. Certainly there are many institutions and ideas in existence that are unfortunate by all modern standards and in terms of alternatives that are now available. Such institutions and ideologies can be prolonged by men whose own interests instead of the interests of general society are furthered. In these cases our rejection processes are inadequate. Nevertheless, the residue that makes up the initial state of a system is the result of all sorts of past influences, and there is at least some presumption that it is serving social needs.

Certainly there is a presumption that what is done and how it is done have merit and relevance to the needs that have arisen. Carried to an extreme this attitude can become a universal "answer" to all problems, for it tends to settle them in terms of the status quo. When such procedures clearly do not meet current needs, it is usually assumed that the needs of the times are changing faster than the profession is able to adjust to the changes. Inasmuch as stability itself is of utmost importance to those who must predict (All of us!), it is highly probable that any system will remain behind some current needs. That is to say, stability itself has important value, and certain changes that would normally make modifications in the system desirable are sometimes disregarded or are not considered until later in order to perserve an acceptable rate of change and cushion us from drastic discontinuities in our exploratory and predictive processes. Such decisions as to the rate of change are essentially incremental in nature and involve matching the sacrifice in maintaining some order and stability with the sacrifice of having out-dated procedures.[4] Clearly any system must have perceptors that anticipate and appraise the two, and sometimes, as in times of revolution, the perceptors and reactors are not acute enough to balance the two kinds of sacrifice, so that the desirability for more current methods takes on such value that the old forms of predictive institutions are rapidly and unceremoniously discarded. As will be pointed out later, the passing of new legislation against the desires of the leaders of the accounting profession may be interpreted as such a revolution.

---

[4] The balancing of stability and adaptability is a fascinating study. DR Scott, who probably would have rated adaptability above temporal consistency, states: "Consistency and adaptation are both necessary in accounting in spite of the fact that they tend to contradict each other. If we accord them the rank of principles, they clearly are principles of a less general order than are justice, fairness and truth." "The Basis for Accounting Principles," The Accounting Review, December, 1941, p. 344. The use of "contradict" indicates that Scott was betrayed by a two-valued orientation and overlooked the broader functional range of the variables.

This kind of study is begun by assuming a level of wisdom, knowledge, information and technical procedures in the storage bins as a kind of intellectual heritage. We then try to locate and specify sources of storage capacity and valves for admitting new information and rejecting old. These "levels" may be compared with electric potentials in that they tend to resist new ideas with more or less resistance at each source or gateway. In a similar manner an idea, once it has been admitted to the system, may become habitual and familiar and develop inertial-like tendencies to resist expulsion from the system.

The repositories of knowledge and also the admittance points for new (endogenous) ideas are summarized below. Some are passive repositories instead of active agents for introduction and expulsion, and in this characteristic they resemble problems of warehousing with the passive function of dead storage and active operations for admitting and shipping goods. The degree of each in a particular area may change from time to time, but it is probable that some remain primarily storage and others primarily active agents. This overview is concerned largely with the admittance and rejection, but some attention to the storage points is necessary for a discussion of the characteristics of tenacity in holding to the old and readiness to accept the new. Each point is composed of people or inanimate objects (books, etc.) whose importance is derived from their ability to influence people.

One of the first, and in this country relatively important, centers for idea processing is university and college departments of accounting instruction. These departments are the repository of much of the accumulated traditional knowledge and are, of course, active in injecting both new and old material into the system. The associations through their leadership consensus, publications, research departments, and liaison groups are especially important in integrating new problems with the old and devising new or modifying old conventions to cover new situations. The leaders of the large public firms perform similar functions. The controller's department of large firms is an important repository and injection point. While businessmen, credit men, investors, and others may be considered as exogenous to the system, it is also possible to consider them and their behavioral reactions as a part of an expanded system.

A number of related professions and professional groups work directly with accountants and with the output of the accounting system, and while they are exogenous, their influence should be recognized and allowed for in structuring a profession. In this class are lawyers with their need to gather facts and opinions and legislators with their need for certain kinds of regulation and control based on accounting output. Engineering groups and economists often develop independent theories that require new information and new reporting patterns. Taxing authorities, and members of regulatory commissions bring problems to the profession for consultation and help in finding solutions.

While we are enumerating some influences on the profession, it seems desirable to add a note on the vehicles by which ideas and information are stored in the system and the vehicles by which new ideas are

transmitted, promulgated and sold to members and users. Clearly storage is carried on through books, publications of research groups, articles, monographs, releases, decisions, rulings, statutes, regulations and other devices of this sort. In addition, in spite of our seeming sophistication, many important items from the heritage of the past are carried in the minds of human carriers. Much of the "feel" of auditing and the adequacy of tests, for example, has been carried by individuals and imparted by individuals, with only minor help from the usual published vehicles. This set of devices consists of speeches that are not published, instruction made on the spot to junior employees, instruction in classes in colleges and in business or professional organizations, and the usual conferences, committee meetings and other small-group meetings that are so often used to convince and persuade others.

These vehicles should not be dismissed readily. Some kinds are extremely effective for transmitting to those with inferior knowledge. Others are in the nature of refreshers. Still others are developed to convince others of approximately the same background and are primarily argumentative in nature.

The problem is complicated further by hierarchies within each of the identified decision centers. In the university instruction centers, for example, the ranks of professors and instructors mean~~s~~ that there are status barriers to new ideas, and prestige is often associated with the elderly members of the firm who are often the least receptive to new ideas and the most reluctant to give up the old ways. A similar situation -- with perhaps a great deal more authoritarianism -- is found in the organizations of controllers and public accountants. Here the caution of the pocketbook and the status of position often stifle the younger men who are fed into the organizations by universities and others instituions that attempt to encourage the reception of new thoughts and to adopt broader horizons of usefulness and responsibility. In the short struggle that ensues immediately after entering the profession it is little wonder that the desire for a living, for promotion, and for the favor of the reigning hierarchy tends to win out over the adventurous ideas of a rare but deserving instructor. In this connection the immediate problems of "getting ahead" in our success-oriented society may demand a function to express the receding importance of ideas from past training and the growing importance of ideas of present and immediate concern. Thus it appears that any mathematical formulation of these relations must use a discount factor of some kind either to discount the impact of past ideas or to expand the importance of present ones. Ideas from the new environment take on added importance, for their acceptance is related directly to the future success of the new member. At higher authoritative levels current status has been reached by using existing ideas so that their importance tends to be magnified. The obvious result is that the rejection of these ideas after they are no longer useful becomes more difficult. To the extent that new ideas are replacements, their admission must overcome the inertia of the induction that the "tried and true" will continue to lead to success. The more mature members who have achieved their status by existing rules are those who have authority to reject or accept the new. The dice are loaded!

It seems desirable therefore to make a distinction between new ideas that do not displace ideas already integrated into the system and new ideas that are in addition to old established lines of thought. Extensions of the latter type should tend to encounter much less resistance for admission. While this factor may be considered separately, in many cases consideration is probably given automatically by adding the resistance to adopting the new to the resistance of abandoning the old. It is possible that the two types of resistance are not additive. In any event cases that call for partial abandonment or modification would seem to merit special consideration.

The influence of authoritarianism on the speed of introduction and rejection of ideas calls for independent study. There is no question about the existence of a high degree of authoritarianism in business organizations, accounting offices, and regretfully, in university organizations. In most cases the presence of this factor is probably a strong deterrent to the introduction of new ideas and the rejection of old. This deterrent arises from the supposition that those in authority have succeeded with old techniques, and in the attempt to preserve their power they will not encourage wide discussion of alternative methods.[5] Certainly they are likely to be older; however it has not been firmly established that age inevitably leads to greater reluctance to change. A more democratic process in almost all cases gives those younger and closer to the educational process more authority and thus may tend to yield a more "progressive" system.

It seems desirable to inquire about the origin of ideas and to speculate about their sources and about the conditions that encourage their birth. It is highly probable that many ideas in the field of accounting arise in response to some problem that arises directly in practical work. Suppose, to illustrate, that a problem arises in the field of governmental control and requires information usually not furnished by the accounting system. The problem and the need for extension of procedures and attitudes is usually discussed first at the top or near the top of the line in the management of the business. Such discussion may involve governmental regulators, accountants and perhaps highly-placed persons in the firm's public accounting consultant. The development of new means to deal with the problems -- the new idea -- may be slow or fast depending on the ability of the personnel to absorb and discard. In some cases public accountants might not be consulted at all unless the controller's office needs help, while in other cases, the governmental

---

[5] An opposing view deserves mention. It may be argued that those in power have tremendous ego needs and must introduce even flamboyant changes to maintain their status. In these cases junior members may develop a technique that permits those in authority to take credit for the new idea. Those who research this area must be on guard to isolate those who introduce the new ideas from those who have authority over their rejection or survival. One may speculate also about the higher status conferred by our society on those who exercise judgment on ideas as opposed to those who develop new ideas. The power to accept or reject is often admired more than the extremely rare ability to generate ideas. It seems incredible that ideas which do not lead to power have little status in most cultures.

agency may first ask for advice from leaders in both public and private accounting practice.

It is probable that members near the top of public accounting houses have the best chance to meet new problems and to develop new theory and techniques to meet the problems. The opportunities are there and the level of ability is relatively high. On the opposite side, it is well known that such leaders are extremely busy both intellectually and socially and are sometimes overly concerned with arriving at a compromise solution that is generally acceptable and with getting on with the job. Moreover, it is possible that a firm that specializes in accounting work may wish to amortize its investment in special knowledge and to enhance its reputation by keeping the information to itself as long as it can do so gracefully. It should be clear that general information cannot be concealed for long, and it is not meant to imply that such concealment is a general policy. Release of information about "how our firm did it" itself carries general prestige, helps enhance the reputation of the firm, and thus may be profitable in monetary units. To find timelag factors in cases of this sort it is necessary to consider the vehicles such as speeches, discussions, articles, client's leakage and other forms of getting the problem and its tentative solution before a more general public.

It is interesting to return a moment to the professor's position in this general process. First, it should be pointed out that professors like any other group of human beings are not a homogeneous group. Some have good problem perceptors and sharp ability to extend the rules and conventions to meet new problems. Others are concerned more with methods of disseminating the accepted information quickly and efficiently. Both types are clearly helpful in speeding up the injection and rejection of ideas from the system. Some professors, unfortunately, fail to have either quality to any degree, view their function as training office clerks, and perceive the profession as it was a half-century ago. Clearly any sophisticated simulation of a profession must study these distributions and fit some sort of distribution pattern to the variations.

Professors, at least in the more affluent schools, normally have more time to consider problems, to study corresponding difficulties in other areas, and to point out what extensions can be made without conflicting with existing theories. But how are professors stimulated and how does information come to them? First, they normally have more time for reading and integrating than high-level public or private accountants, so that written vehicles such as articles, releases, statutes, etc., are of particular importance. The professor learns what new problems are arising and how the profession is moving to meet them by talking with his colleagues, by belonging to and attending professional meetings, by joint meetings with public accountants and businessmen and others at the practical level. Professors should be closer to economists, statisticians, mathematicians, engineers and others than the practical man of accounting affairs, and these related fields should do much to keep him informed of new intellectual developments in such fields. To many overworked teachers these relationships are their chief reason for staying with the profession, but in far too many cases accounting teachers are either too narrow in their orientation or have not had sufficient professional ex-

perience to profit from their opportunities. One characteristic of a scholar is that he reads and digests new material with the hope of fitting it into a broader pattern of knowledge. The professional man often digests new material much more efficiently, but he uses it as a tool to meet an immediate problem.

We are then faced with the possibility that teachers of accounting should also be practicing accountants. If ideas come forth in response to problems and problems are encountered primarily at the practical level, it seems to follow that a speedup of new ideas would result from the development of the combination professor-practitioner. It seems clear that part-time practice at the proper level of difficulty should be helpful, but it is just as clear that such practice may infringe on the available time for mulling over theoretical problems and requirements. Thus the professor-practitioner may have less time for thinking and developing his ideas. There is a further danger that he will forfeit his position of trying to fit changes and new ideas into the general intellectual framework and accept the more pressing "view of the moment" approach. The results may be a series of skirmishes with brush fires rather than the integrated and consistent system of principles and conventions that he should be trying to develop. Thus the simulationist -- and the profession itself -- is faced with the determination of an acceptable combination of all sorts of practical techniques, specified objectives and general theories.

Delays in the System

It is necessary as a preliminary step to identify the centers for admission and rejection and for storage of ideas and to diagram their relationships. The problem of delays in the system is so important and they occur at so many points in the system that they deserve a separate discussion. Delays may, and probably do, occur at all interchange points between individuals in the system, and, due to differences in perception time among individuals, any simulation should provide suitable distribution functions.

Schools have a particularly important part in delays. Suppose to begin that a given professor in a large staff somehow comes across an idea of merit. Assume also that he has completed the preliminary stage of convincing himself and working out details so that he will not appear ridiculous when he starts his active advocacy. This stage in itself involves some delay, and even previous to this stage, there is usually delay in learning of the problem and arriving at the conclusion that the problem can be worked on with some chance of success. This professor will then bring the idea to his colleagues in an effort to get them to understand it and perhaps join him in advocating it. Normally he will bring it to his classes and observe student reaction.

When the idea is new, there may be a tendency for it to appear to be more difficult than some of the older ideas with which he is familiar. Thus the new extension tends to be introduced first at the more advanced levels and then to work its way down to the more elementary courses.

The result tends to be a sort of last-in, first-out procedure in that the more advanced students finish sooner and therefore take the new ideas into practice more quickly. In this way the ideas are introduced outside more quickly but the first students to leave have less time to assimilate them and to integrate them with the existing stockpile. While it is probably true that students will take up new ideas with more speed than professors, it is also probably true that unless fellow professors are convinced of the importance of a new idea, they will emphasize competing ideas, and the student may remain unconvinced and therefore be lukewarm in his acceptance and advocacy.

Even if the student leaving the university has been fully convinced of the superiority of the new extension, his influence in the accounting profession for several years is likely to be very small. If most meritorious ideas came from the university professors, this delay would be serious indeed. The student graduate usually takes his place at near the bottom of the accounting hierarchy in either public or private accounting. Of course, he has opportunities to discuss and advocate his ideas with men at slightly higher levels but in the typical authoritarian structure his influence is often slow in developing.

There are internal delays of this sort at each level of leadership in universities, accounting offices, and among the users of accounting products. Empirical studies should indicate that knowledge and ideas sift down from the top of the hierarchy with considerable more speed than they are likely to rise or to move crosswise. The delays in perceiving need and delays in moving to find what solutions are effective or not effective may also be classified as internal delays, but they differ in that they are not delays brought about by the necessity to persuade. For research purposes it seems desirable to separate persuasion. delays from those necessary to appraise the desirability of the extension.

A more direct route for the dissemination of new methods and ideas with considerably less delays may be found in the so-called executive training courses and sessions that are now so popular. These courses tend to give the professor access to managers and practitioners who are able to make almost immediate use of ideas. Moreover, members of the group have opportunities to try out the new information and to appraise the ideas of others in different contexts. While members of such sessions are often on the lookout for help with their immediate problems and therefore tend to slight the broader aspects, i.e., get new ideas that can be used without considering the broad view, they still are subjected to new insights that could revolutionize their attitudes. There can be no question of the dissemination speedup when such training is compared with the usual student route, and one should not become prejudiced by occasional blatant overselling of such courses on the wrong grounds.

Perhaps the fastest route for the introduction of new ideas by members of the professorial clan is by way of top-level consulting. Not only does the professor get material for new ideas from the problem environment but he has an opportunity to get his own developed ideas into policy with less delay. Businessmen usually hire consultants with the

hope of getting new ideas to which the firm has not previously had access. They are therefore in a mood to listen and, when convinced, in a position to act. Whereas the necessary time for dissemination through regular student channels might be in the order of ten years, it is conceivable that a few months would suffice if the ideas could be projected at higher levels. It is also probable that the financial position of the firm and the security of its officers may be relevant variables that influence the speed with which new ideas are received and accepted.

Constant urging from the dean's office for professorial lectures and speeches to groups that seem to offer little challenge is often irksome to the productive scholar. Yet it should be clear that this device is one of the best available to speed up the dissemination of new ideas from the professorial chair. It is important that professors use such opportunities effectively with carefully prepared material tailored to fit the mood and ability of the audience. The prevailing mood has far too often blinded the speaker to his opportunities and has led to handling out the most banal pap with inspirational oratory and in a carnival spirit. These listeners often make up the kind of audience that the professor should be seeking. They are competent men at manipulating others and have demonstrated their competence in this direction. Often they are in need of new and fresh ideas in order to impress their superiors and to win promotion and prestige within their organizations. These folks may *need* new ideas to get ahead, and often they have not reached the stage where "sound" judgment is identified with preservation of the *status quo*. An added advantage of such programs is that they tend to aggregate and snowball in the sense that they often help promote the ideas of struggling young men whose ideas are being put aside or diluted by their immediate superiors. This dilution and pushing aside by immediate superiors can be extremely important, for these superiors are essentially sifters who let pass upward what they think will benefit the firm or perhaps themselves. If they feel that their superiors are receptive they often will permit new ideas from fresh graduates to go up the line with more speed and without so much concern for their job security. Such sessions with middle and upper management may therefore prepare the way and increase the rate of progress.

Schools themselves differ tremendously in general quality and also in the perception of their responsibilities. The weaker schools require so much teaching and low-level practice from their members that the problem of idea development is often not treated as a matter of concern. It may be feasible to encourage the faculties of such institions to keep abreast of new ideas, adopt modern materials and to take part in new theory formation, but mediocrity in such schools is too often self perpetuating. Bright, well-trained young men from the *avante garde* institutions are extremely reluctant to go to academic graveyards, and the result is that these schools tend to hire products of similar institutions and to perpetuate views that are already antiquated. Threats to job security for the older members through the introduction of new ideas is often not tolerated. The point to be emphasized here is that these institutions are a retarding (delaying) factor in idea dissemination so that we need some sort of scale to measure the vari-

ation and importance of such educational institutions. Corresponding scales must be developed for the wide variation in public accounting firms, with provision for discontinuity between national and some local firms, and among controllers' offices. It is probably fair to state that the differences between quality of internal accounting staffs is at least as great as it is in universities. It is not always true that the larger firms have the better staffs, for entire industries have a tradition for unimaginative accounting work. Blame in the case of railroad accounting is usually placed on regulatory systems that follow 1907 and 1914 methods. Before turning to the area of government it should be emphasized that the faculties of important institutions have tremendous opportunities. They are in a position to perceive and estimate information needs for all kinds of future contingencies. Without the pressures of the profit motive and the need for immediate brush-fire relief, they can short-circuit the longer historical process without sacrificing their shorterm personal income and without a personal stake in preserving the status quo or advocating specific changes.

The role of associations of public accountants, cost accountants, teachers of accounting, etc., and their organizational structures should be given some attention. As a rule, an association has influence far beyond the importance of the number of its members, and some sort of measure should be used to modify those areas of a profession that are subject to strong associations. Associations often are formed and operated by the most influential men in the profession. It does not follow that the leaders of a profession with demonstrated ability to influence people are also leaders in the development of new theory. In rare instances the most reactionary members have captured professional associations and have set up what is in effect a self-perpetuating managerial elite. Such men are important for the propagation of ideas for they have both the organization for propagation and the demonstrated ability to convince their colleagues. Thus, it is indispensible for the discoverer of new theory to attempt to convince this group. In most cases the leadership of these organizations has been on the side of stability, but the pressures of those who consume the output of the profession mean that they cannot be completely oblivious to new ideas.

In the typical association of this type the work is carried on by committees made up of appointees who are familiar with the problem areas and have some ability to develop new ideas. It is at this level that an intellectual has the best chance to operate and to have his ideas adopted. Adoption by a committee is no guarantee of adoption even by the association, because the general veto power is usually kept by the leadership of the association.

Many organizations apparently have failed to realize the impact of the releases that are sent out with their approval, yet the rigidity of such releases may be comparable with the rigidity introduced by a court structure. These releases and their function in a profession need careful examination, for their function is essentially one of stability and the development of conformity. Uninspired schools of business often look to the Association of Business Schools for detailed guidance, and correspondingly one finds many accounting offices and firms that follow

association releases with no serious attempt to criticize or modify them. Weak courses in accounting theory too often follow the releases in an uncritical manner. A hidden strength of such releases is due to the fact that those who do not wish to develop ideas or are unable to do so can use such guides as "cook-books" to accomplish useful work. There is an added incentive to use "authoritative" pronouncements in that the personal onus of rejecting a client's plea can be shifted to the organization or group by citing the authoritative release. Thus the releases and other pronouncements of respected associations tend to become important carriers of ideas in a profession, and the problem of introducing new ideas becomes an important task for top-level committee personnel, who may be far removed from the ordinary practitioner. Furthermore the introduction of changes may become difficult due to a fear that shifting positions will destroy the authoritative feeling for the pronouncement and for the organization. On the other hand, an advantage for introducing ideas arises from the definite and well-marked path that must be followed in order to get new ideas introduced. A knowledge of where to go for a hearing and who must be convinced may actually help the introduction of new theory. The procedure may be superior to formal judicial processes, for a court often requires an existing wrong of some kind before it will hear the case. However the power of "insiders" to veto or expedite new ideas without wide publicity is probably greater in non-judicial procedures.

So far we have not considered the influence of schools and public accountants directly on users of accounting output. Users of information introduce delays in the system by their failure to feel the need for new or better information. In some cases they do not know what new knowledge and techniques are in fact available or how the profession may be able to help them. Inasmuch as they are motivated by self interest, it may be assumed that consumers of accounting will be interested in new developments. Moreover, it is to the self interest of public accounting houses to call certain kinds of new information to the attention of their clients. (In some cases, unfortunately, there may be self-interest working to conceal bill-reducing improvements.) In spite of these obvious operations of the self-interest principle, clients often need education in the sense of explaining the latest techniques available to satisfy their needs. In some cases the client's own lawyers or engineers will recognize client needs and initiate search for new theories and ideas.

What can be said about governmental agencies and their record for perceiving social needs for information? These agencies are themselves users of accounting output, and in addition they function as spokesman for users that would otherwise be unorganized. The latter function is a primary objective of the Securities and Exchange Commission. This commission was set up originally because of the failure of the accounting profession to perceive the needs and requirements of an industrial society and of the lack of power to insist that its accounting standards be followed. This failure was due in part to the profession's identifying its interests too closely with leaders of business who themselves had self interest in a different type of information from that desired by the ordinary investor. There were many dissident voices in the accounting profession who lamented the inability to force conformance with acceptable

standards, but the wisdom displayed by the leaders of the accounting profession at that time must be judged weak by almost any standards. Moreover, this lack of wisdom persisted in the failure of professional leaders to see the seriousness of operating a professional service with ad hoc principles until approximately World War II. Some argued that there were no accounting principles or, worse, that the principles were so obvious that there was no need to discuss them and make them available to the general public.[6]

The function of the Securities and Exchange Commission is most clearly seen as a perceiver of user needs and the enforcer of minimum acceptable disclosures to the unorganized investor group. In the former capacity it operates to discover problems, helps the profession initiate new and acceptable theory to meet the problems, and in the second capacity it acts to enforce minimum standards on the profession. That such a commission exists is, itself, evidence of the weakness of the public accounting profession. Yet its presence adds immeasurably to the effectiveness of the profession by adding sanction and authority to what professional leaders would like to do and by helping police less responsible members of the profession. The limitations and dangers of such commissions and agencies are well known and will not be belabored here.

Many other agencies of regulation are concerned with accounting only in connection with a larger area of regulation that makes use of accounting information. Such agencies are likely to perceive need for a somewhat limited purpose (seldom as broad as the interests of all investors), and as a result they have sometimes hindered the progress of the profession almost as much as they have helped it. The income taxing process, for example, has dimensions, such as subsidies, penalties and the necessity for reducing the nuisance cost of collection, that do not appear in other parts of accounting. Thus some of the niceties of income measurement and matching expired cost with benefit may be casualties in the desire to accomplish social goals and to keep amended returns to an acceptable level.

For some reason or other our experience with regulatory agencies and their administration in the United States has not disclosed keen perception of needs and subsequent development of new and appropriate theory. Many insist that such an attitude is inevitable. Others hold that personnel has been generally incompetent or that the delegated responsibility has been so narrow that administrators lose interest in the broader aspects of social purpose and professional responsibility.

Professional Service and the Price System

Some accountants have felt that a free price system will provide an automatic weighting of the relative importance of the groups contending for information. This group feels that the courts and the legislative process should set the ethical tone for any profession. Thus it is argued that members of a profession can follow their self-interest so long

---

[6] Even after one allows some bias and bitterness the statements of Howard C. Greer may prove to be shocking to the younger generations of accountants. The Accounting Review, January, 1956, "Benchmarks and Beacons," pp. 13-14.

as they operate within the permissive legal boundaries. This approach removes the ethical flavor from a profession except in the rudimentary sense of legality and tends to fit it into an enterprise system that attempt to harness the self-interest of individuals to do the world's work. As we shall point out below, such an approach is consistent with the informed electorate doctrine, the advocacy principle in law and the informed, economic-man approach to the marketplace. It must be admitted that a profession without guidance except from the money value of its products to individual users hardly qualifies as a profession, yet this pragmatic attitude is used with tremendous success in many areas of social endeavor.

The production and distribution of economic goods, as suggested before, is carried on largely through the mechanism of the market in which consumers are substantially in charge of the direction of production. If one supports the free-price system, one is committed to the belief that consumers are rational enough to sort out the exaggerated claims of producers and make decisions that will be generally satisfactory. When it is not feasible to determine quality by inspection, the government has stepped in, e.g., pure food laws, but a denial that the consumer is rational enough to use his purchasing power satisfactorily usually requires an agency or a board -- an elite group -- to decide what goods are to be produced and in what quantities. Self interest is directed toward efficient activity, and informed buyers should weed out the rascals before serious harm is done.

The judiciary system is also based directly on the advocacy principle. It is assumed, with some support, that if each contending party is permitted to present his case in the best possible manner without concerning himself with abstract justice or ethics, the judge will be presented with the pertinent facts and issues. Further, it is assumed that judges are intelligent enough to separate the wheat from the chaff, and, with relevant facts and cases presented as the result of self interest on the part of the contestants, they will reach acceptable decisions.

The present political system, in America, is based on a variation of the advocacy system. The selfish nature of human beings is assumed, and the problem is to direct it to acceptable social ends. Candidates with all kinds of axes to grind can be expected to present their claims in a forceable manner either within the party structure or against opposing parties. The resulting campaign verbiage seems fantastic to politicians from other countries. Our whole system assumes that the voter is astute enough to separate the ballyho from rational claims and to act accordingly. Notice that the satisfactory working of the system does not require that every member of the electorate be rational enough to make such decisions. There must, however, be enough folks so that each contending party is forced to show some signs of compromise and perhaps ameliorate some extreme claims in order to appeal to that group. Observe that if one denies that the voters as a group have the ability to select satisfactory programs, he is forced into defending decision making by elite groups and a rough measure of his democratic spirit may be in terms of the size of the group that he feels should make such decisions.

The fact that every profession puts forth some sort of code of ethics indicates that most professional people do not hold an unrestrained price-system approach. One explanation for this modification of the price system is that the legal machinery is general and that the ethical code fills in the "specifics." Some may feel that such codes "anticipate" legal changes, smooth the effects of such changes when they do appear, or even serve as models or pilots of what needs to be done at the legislative level. At the extreme position are those who feel that the function of a profession is to keep the price system from working in the area.[7]

Both views encounter difficulties. Most advocates of unmodified price allocation do not believe that a vital information service should be guided entirely by the squeak of the money wheel. In this case, what should be our professional policy if one solvent segment wants inventories carried at zero, and another equally eager and solvent portion of the market wishes stocks handled for costing purposes on the last-in, first-out basis? Those who favor the "market product" approach to the profession would probably feel that giving statements prepared with both assumptions is the proper attitude until one group has established economic superiority. Are we then to prepare as many statements with as many conflicting assumptions as someone is willing to pay for or coerce someone else to pay for? Shall each different statement be labeled and identified with the purpose for which it is prepared? Is there any reason why a client (customer) cannot have a statement prepared to his specifications and present it to another interested party who would, if he knew matters, insist on different specifications? Should the accounting profession ignore such matters and adopt a caveat emptor attitude? Are we to disregard the fact that certain groups may be well organized and present their desires forcefully and with adequate buying power while groups that are more important in total strength are scattered and their cases are not forcibly presented? Should we modify when clients cannot appraise the values as we modify food and drug laws? Do managerial accountants have responsibilities to others? If so, to whom? Is the motto "service not profit" equivalent to the socialist's "production for use not profit?"

---

[7] The position of DR Scott and other Veblen disciples is that the price system is breaking down and must be replaced with "professional" attitudes. The following statement sets forth the position and anticipates the recent flood of intrafirm-transfer-pricing articles by a few decades. "In a competitive system, the market adjusts the conflicting economic interests of all those who are competitors in the market. But when the typical unit of competitive enterprise become a complex group of varied interests, the market could not provide effective adjustments between them....the dependence upon accounts is much more direct and complete." "Accounting Principles and Cost Accounting," The Journal of Accountancy, February, 1939, p. 73. See also his "The Basis for Accounting Principles," The Accounting Review, December 1941, pp.341-349.

The problems are not confined entirely to those who want to use the price system. One important problem that confronts the ethical "school" is: How does one assess client worthiness and need? Who makes these decisions for the profession? What are the criteria for decision? These topics are discussed briefly in the essay devoted to ethics and normative considerations and are only mentioned here. The remainder of the present discussion is devoted to speculation about the development of a profession and its boundary problems.

Some degree of integrity and competence is necessary to support the term 'professional,' and it is necessary to have standards. These norms or standards help attain predictability of results regardless of the particular individual who happens to do the work. It seems desirable, therefore, that the rules of the game not be contradictory. It is often embarrassing to find that ethical, competent members of a profession may supply from identical data widely different answers to identical questions. Uniformity and consistency are therefore desirable, and the entire apparatus of accounting must be subjected to the rules of formal logic which are designed to expose certain kinds of contradictions. Yet there is a cost for uniformity and the problem becomes an incremental one.

It may be of interest to digress a moment and speculate about possible lines of development of accounting rules and doctrines. The following hypothesis does not pretend to meet all demands of objective history. Suppose that certain practices developed in response to needs and demands for accountability and reporting. Some degree of uniformity in behavior may have developed and a second stage in the development may have resulted from attempts to find uniformities in practice and present systematic lists of existing procedures. These lists of uniform rules and procedures undoubtedly acted as guides for training new personnel and grew in stature until they reached the status of "authoritative pronouncements." Individuals who mastered these authoritative rules found that they had something in common, organized and developed sanctions for enforcing the rules.

Up to this point the rules probably developed by observing uniformities in practice; but practice changes. Those rules that appeared time after time in succeeding "lists" were probably dignified by the term principles. If a rule no longer fitted the needs of those who employed accountants it was dropped from later lists. Thus a rule that survived for some time and was included in later expressions of measurement folklore was permanent enough to be called a principle, given ancestral status, and accorded respect.

Moreover, a group of quasi-priests developed. These insiders made up the professional core of the art and, among other things, it was their duty to arbitrate the diverse demands of those who consume professional products and to decide when a rule should be dropped, added, or modified. Thus it appeared as if this group were creating new principles. In one sense new principles were being created, but it should be clear that the group was (and is) extremely limited in its freedom to add, remove, and modify rules. The modifications must be

in harmony with the social needs and desires unless the profession wishes to die quietly. It is possible to surround activities with ritual and mysticism and thereby perpetuate obsolete practices for long periods, but it seems reasonable to conclude that sooner or later other social groups look through the professional veil and stop their support for such practices. At any stage of development all professions undoubtedly have a number of outworn principles that have survived Darwinian selection, but these exceptions are probably relatively unimportant.

It should be clear that the actual things done by members of a profession crowd the boundaries of other professions. Project analyses and feasibility studies may be made by accountants, managers, engineers, and any one else who at the time feels competent to undertake the work. Determining the relevancy of specific costs to alternate decisions may be attempted by several groups. Accountants many times have been accused of unauthorized practice of law. Actual professional boundaries are shifting and creeping to adapt to new conditions and to take advantage of weaknesses in neighboring fields. In addition to this dog-eat-dog elbowing at the margin, operations within the settled part of the profession are shifting to meet new conditions. Thus definitions need to be related to their environment, and temporal subscripts may be essential for understanding them. (Apparently some current school administrators still cling to a definition of accounting that should be correlated with the subscript '1900'.)

There is little doubt that accounting has been aggressive in adding to its empire. Perhaps an aggressive attitude is a universal attribute of new institutions and new fields of inquiry. Certainly sociology and political science have not been backward about extending their empires, and not so long ago economics (political economy) was a serious containment problem for historians and philosophers. Even within the field of accounting there have been upstarts who tended to upset the traditional divisions of the market. Almost before the financial accountants realized what has happened, the aggressive managerial accountants have all but appropriated the budgeting and control (controllership) aspects of the field. Concurrently the area of accounting had overflowed into the lucrative tax field, and within the field of accounting tax accountants have placed their stamp on large parts of what had been general financial accounting. Lately we have seen the rise of internal auditing, which, according to its more enthusiastic supporters, includes everything of importance in accounting except the recording function. Moreover, internal auditors have not been entirely satisfied with appropriating business from others within the profession; they have moved in on engineers, production men, treasurers, and research specialists.

Controllers during the depression and immediately prior to World War II were in an extremely powerful position. They had the budgeting area pretty much to themselves, for market research was often immature and finance officers (including professors of finance) had not discovered capital budgeting. Moreover controllers usually controlled the tax department (in spite of some protest from lawyers) at a time when taxes were becoming a major item in business operation. Since the war the controller has encountered some challenges. Lawyers used the "unauthorized practice of law" approach to limit the accountants' expansion in the

fields of taxes, estates and trusts. Business schools added courses in business economics, industrial engineers modernized their weapons and supplied analytical material for the mortibund production courses. Statistics provided new and exciting methods that extended probability theory to subjective values and decisions. But the greatest challenge undoubtedly comes from those in computer technology and operations research. These developments are discussed elsewhere and are mentioned here only to support the contention that professional boundaries are fluid and sensitive.[8]

While boundaries may be sensitive and alive, academic discussion of scope and method tend to be sterile and dull. Except for those interested in the jurisdictional aspects of professional activity, boundary problems tend to be important primarily in determining the decisions that are entirely under the control of the leaders of the profession (endogenous) and those that are made by outside decision makers (exogenous). Inside a profession the old-fashioned and elementary distinction between ends and means has enough usefulness to merit careful discussion. Some thought about the purposes of accounting -- the ends -- is usually rewarding and stimulates thinking about the decisions that have to be made, the personalities that may make these decisions, and the relevant factors for decision making. Attention to the vehicles -- means -- of accomplishing accounting purposes often gives a framework for discussion and permits specific practices to be placed in the broader mold formed by the objectives, so that they may be accepted or rejected on the basis of conformance or nonconformance to these ends. Thus conventions and rules may be classed as means and placed against the general backdrop of objectives and evaluated accordingly. However, except for possible degrees of flexibility careful distinction hardly seems necessary to support Gilman's sharp distinctions among rules, conventions, standards, and principles.[9]

---

[8] "It would be detrimental to those [areas of service] served as well as a brake on further development [of the profession], if each area of specialization were to be sharply limited by those trained and competent to operate in it. This would leave the twilight zones in between to be filled by less competent advisors..." Donald P. Perry, Public Accounting Practice and Accounting Education (Boston: Harvard University, 1955), p. 25. Unfortunately the more competent intellectuals do not always win!

[9] Stephen Gilman, Accounting Concepts of Profit (New York: Ronald Press Company, 1939), esp. Ch. 13. Cohen states: "The relation of means and ends coincides with that of cause and effect to the extent that both means and causes are antecedents which precede ends and effects as temporal consequences....In the relation of purpose the value of the antecedent is viewed as determining the nature of the consequence." Morris R. Cohen, Reason and Nature (Glencoe: The Free Press, 1953), p. 263.

AUDITING -- AN APPRAISAL AND SOME RECOMMENDATIONS

A large and important part of the accounting field is composed of procedures and attitudes known as 'auditing'. This area appear to be deceptively simple because its procedures are so closely related to the evidentiary aspects of opinion formation and to accuracy in reporting. Auditing as an activity is carried on in order to get people to do certain things and to refrain from doing other things. The problems therefore are relatively easy to classify. First, objectives must be identified and the courses of actions necessary to accomplish these objectives must be specified. In the latter process a whole host of actions which are detrimental to worthy objectives are sometimes recognized. Auditing, then, aims to encourage actions consistent with worthy objectives and discourage actions which hinder such accomplishment or further conflicting goals.

An appraisal of the activity tends to get messy at the operational level, where it unavoidably becomes entangled in behavioral hypotheses and ethical value judgments. Moreover, in spite of the work of the American Institute of Certified Public Accountants, a general approach to auditing problems has not been forthcoming. Early commissions to auditors often called for specific investigations and narrow objectives, and the objectives often varied. A bank lending officer might ask for an investigation to establish the existence of certain assets. Owners might wish to be assured that management's stewardship reports were accurate in these and other details. Managers and owners might be interested in a breakdown of ethics with fraud, embezzlement, and misrepresentation. Insurance adjusters might wish evidence that safety or fire regulations were being followed. The auditing profession has attempted to weld such aspects of its work into a general framework, but progress has been slow, subject to some backlash, and confused by alternative techniques. For example, the auditing professor now emphasizes the objectives of establishing accurate management representations to the extent that disclosing fraud (once a primary activity) is currently an extremely minor objective. Yet most of the techniques of auditing are still aimed at uncovering fraud! In fact, the very earliest techniques devoted to certifying to the existence of assets and liabilities at a balance sheet date tend to accomplish the "representation" objective about as well as some of the more modern techniques with the obvious exception of the modern business approach.

Turn now to some of the more obvious objectives. Auditing is generally assumed to be carried on by individuals who are not involved in making the entries (classifying and recording the data). Clearly one can check, recompute, and correct his own work, but, by definition, auditing implies at least one additional individual. This feature is probably built into the definition, because accountants in all feasible cases separate individuals who handle assets from those who record information about them. The induced psychological barrier is thought to be considerable.

It is doubtful if the barrier is twice as imposing if a third individual enters the cycle, but it must be more formidable to some degree. At this point the inadequacy of the profession's knowledge of behavior becomes critical. Little or no knowledge and often only the most tenuous hypotheses are available. For example, if two parties are involved, does it make a difference in the strength of the barrier if the parties are in the same or different age groups? Same sex? Same levels? Work in different parts of the organization? Are or are not church members? College graduates? Our knowledge is almost entirely limited to a general understanding that the barrier is weak when an inferior passes on the work of a superior and does not perceive the situation as an opportunity for getting rid of the superior. Even this knowledge is little more than an hypothesis. In a similar way accountants are confident that the introduction of an auditor as a third party in the cycle increases the strength of barrier. Moreover, they feel that the barrier is increased if the auditor is a traveling auditor with less opportunity to fraternize with other members of the trio. Surviving professional wisdom of this sort should not be dismissed too quickly. The purpose here is to point out that the importance of outside intervention is so deeply ingrained that it is included in the very definition of auditing. A subsidiary purpose is to emphasize the need for systematic, high-level research in the behavioral aspects of this problem.

The probable influence of expected audits on employees and their attitudes toward work has not been investigated sufficiently. A number of graduate students have designed some experiments in this area, but such simulation studies are highly artificial. It is almost impossible to simulate the tremendous personal stresses that are involved in actual conditions. The stakes are often high (especially in embezzlement cases), and classroom simulation reminds one of playing poker with matches. It is in fact extremely difficult to evaluate any control system without considering the reward-penalty system as a whole. With regard to clerical accuracy the personal advantage to the worker within broad limits is usually small. The consequences resulting from discovery of continued poor work may exceed a tolerance limit and result in loss of the job. Even here the worker can weigh the probability of getting caught and the possibility that the error, if caught, may be considered to be a human error, i.e., superiors may have a high tolerance for errors of this type. The employee's calculation of the probability of being caught is obviously affected by his past experiences with detected and undetected errors and by the reports of others on such matters.

In some cases employees have positive self interest working in the direction of misrepresentation. These for-interest incentives are in addition to the general penalties of reprimand, loss of job status and discharge. These cases may involve bonuses, overtime premium, citations for efficient work, promotion, etc. The auditing process normally is designed to be more searching in those areas (in the direction of self interest). Yet these areas have not been covered in a systematic manner. We do not know, for example, how important the failure of past audits to discover similar errors tends to be. If this factor is important, a poor audit may be far worse than no audit at all. We are also vague

about the influence of slight changes in the firm's tolerance for dishonesty. There may be some reasonably smooth functional relations, or there may be sharp discontinuities and critical areas. What are the consequences, for example, of the profession's general disclaimer of responsibility for discovering fraud?

One of the few bright spots in accounting research in this area is an investigation of embezzlement by Cressey.[1] These findings indicates that knowledge of existing undetected errors is an important factor, because such knowledge points to the possibility of a solution to the employee's problem. "Borrowings" may be undetected until the funds can be replaced so that no one else will be the wiser. Perhaps such unauthorized borrowings will never be discovered even if the funds are not replaced. At any rate, knowledge of undetected (or belatedly discovered) errors or shortages undoubtedly suggests a possible solution to an intolerable stress. The need for generous research at this level is certainly clear enough.

Cressey has concluded that one ingredient of embezzlement is a "non-shareable" problem, and Cannon points out the relationship of non-shareability to the auditor's traditional concern with collusion.[2] If the stress centers on the individual and cannot be shared with the other members of the group or with outside individuals, there appears to be less tendency to collusion. According to Cannon: "...our general approach to internal control, i.e., of not worrying about collusion, would seem to be on the right track."[3] Cannon's statement seems to need modification. To the extent that prospective embezzlers know that typical internal control systems require collusion, the necessity for collusion becomes an essential part of the "solution." The potential embezzler then conducts his search in terms of the operations he must undertake to effect the solution. Collusion is among the operations usually required by an accounting system. It seems therefore that auditors and system specialists should reexamine any tendencies to stop "worrying about collusion." Actually the thesis of non-shareability has not been established beyond question. Furthermore, it may be possible that the individual problem is entirely personal, but others in the necessary collusion cycle may have their own personal problems and collusion (with attendant embezzlement) may be a solution for

---

[1] Donald R. Cressey, Other People's Money (Glencoe: The Free Press, 1953). This research is concerned with 113 cases of embezzlement at Joliet State Prison. An excellent summary of certain auditing aspects may be found in the book review by Arthur M. Cannon, The Accounting Review, January, 1956, pp. 156-157. Cressey summarized some of the conclusions in "Why Do Trusted Persons Commit Fraud?" The Journal of Accountancy, November, 1951. (Cannon also points out that the study deals only with those who were caught.)

[2] Cressey, op. cit., pp. 30 ff. Cannon, op. cit., p. 157.

[3] Cannon, op. cit., p. 157.

all. Again acceptable professional procedure seems to call for more empirical studies on the fringes of behavioral science.

Some attention has been given to the field of accounting as a communication system with the usual shortcomings of any language system. Some events are expressed well in the system while others are almost impossible to communicate without supplementary devices. Changing the location and arrangement of items in the statements provides a partial substitute for intonation. The very fact that the consequences of an event are measured and reported has the effect of communicating the firm's *concern* with the matter. Unfortunately, only major embezzlements and frauds are given separate billing in reports to owners and the importance of day-to-day accuracy and honesty must be communicated in other ways. The fact that auditors are employed at all should communicate a message of importance to all who handle records or are responsible for assets. The message is essentially an implicit statement that the direction of organization assets to non-organization objectives will not be tolerated and that the accuracy of compiling and reporting information is a matter of importance to the concern. The possible deterrent effect of such a simple communication of objectives may be important even without supplementary rewards and penalties. Research with regard to communication systems should prove to be useful.

The use of auditing to assure absentee groups of the reliability of management's reports is now seen to be an extension of the broader functions of establishing the reliability of all reports on organizational activity at all levels. The reports themselves -- form and content -- are designed to communicate the objectives to members and also to communicate accomplishment of objectives to all groups. The existence of scrap reports argues for the importance of scrap control, and a detailed record of sales returns should convince employees that returns are a matter of organization concern. There has been some tendency toward a division of labor between so-called internal and external auditors, but the point of interest here is that the entire accounting process may be approached as a tremendously complicated communication network. It contains a web of internal tests for consistency and accuracy, and should be considered with attention to the sanctions that support it. The study of the structure as a system isolated from the attendant rewards and penalties has chiefly academic interest. The strength of the barriers and the importance of positive rewards are influences that (along with relevant behavior patterns) establish the adequacy or inadequacy of the communication system.

The broad systems nature of accounting has complicated the problem of loyalty and responsibility. To some extent the communication system attaches to the entire organization, and one must ask who speaks for (represents) the organization? Clearly reports are made at all levels of authority, and auditors try to vouch for the general accuracy of all reports. In many cases the highest management level seems to speak for the organization, and many auditors have associated their responsibility with this group. However, the recent emphasis on rendering opinions about management's representations indicates that interested parties other than employees and managers are usually given consideration.

This ambivalence deserves attention because of the current concern with advocacy versus independence in the public accounting profession. The public accountant is certainly an advocate in the sense that he functions by giving service to a client. The difficulty arises in determining who are the clients. Past identification with management and management needs has led to a shift in the direction of independence, but independence from whom? In some instances a public auditor is a definite advocate of owners, managers, etc., and opposed to various governmental agencies. In other instances he restricts the freedom of action of management and others in the firm. At first sight, this ambivalence seems to place an impossible stress on the ethics of the profession.

Undoubtedly, uncertainty over the advocacy-independence position does place stress on the ethical standards of the profession. The stress is increased by the fact that it is difficult to oppose the group that engages and compensates the auditing firm.[4] Clearly some ordering of importance to be attached to various groups (including government agencies, competitors, etc.) is necessary. It is necessary to decide approximately who are insiders entitled to accountability and who are the outsiders with relatively less important claims for information. Perhaps a more useful approach starts with identifying the needs of all sorts of individuals doing the organization's work and forming professional standards around the general objective of furnishing dependable, unbiased , helpful information at all levels.

It may be argued that certain types of work call for special qualities and responsibilities. A policeman, for example, is expected to exhibit more bravery than the typical citizen, and teachers should be expected to display above average intellectual integrity and honesty. Auditors, as a professional group, according to this reasoning, should have a special duty to be accurate, dependable, and honest. Those who succumb easily to requests for special-interest variances should be ruthlessly weeded from the professional garden. The profession's code of ethics and rules for professional conduct should serve to identify the responsibilities involved and to communicate the urgency and importance of professional objectives.

As a minor digression the ethical position and responsibilities of managerial accountants are worthy of comment. One asks whether managerial accounting is only a tool of management. Do managerial accountants have responsibilities for reporting to outsiders, measuring income, disclosing plans and estimates? In other words, are they merely "errand boys" (an SEC phrase) for managers? The view expressed here is

---

[4] Professor Robert Dinman has point out that public accountants take an advocacy position when a government agency or tribunal assumes responsibility for protecting the public interest. If there is no intermediary to represent outsiders, the auditing profession functions as such an independent intermediary.

that members of any service profession or activity must be "errand boys" for some groups or some individuals and that such a relationship is unavoidable and desirable. Nevertheless, the layers of management are not homogeneous and a broad view of management includes all individuals or groups whose decisions affect the affairs of the chosen entity. For example, owners, creditors, suppliers, etc. become "managers." In order to avoid complete segmentation of an information-control system with different accountants representing each knot of decision makers, we try to establish a whole series of constraints that begin with broad social needs. We can construct consistent rules and actions for each set of restraints, and provide for the necessary coordination of the segments. Certainly some standards of accuracy, honesty and efficiency can be applied to all levels of bookkeepers, accountants, and managerial accountants.

Limperg's Behavioral Approach to Auditing

One of the most advanced and articulate approaches to the function of auditing in a social order was advanced by Thomas Limperg and is still modern a quarter of a century later.[5] Limperg's contention is that the reports of a good information system, e.g., auditing, should incite "proper" expectations in the minds of its readers. These expectations should lead to informed and desirable action. More specifically, a social need (function) exists for dependable, reliable information. The self-interest of those who report on their own activities is an argument for unreliability in their reports, and it is unlikely that such reports merit a high level of confidence. The need for reliable information is obvious, and there should be a net social gain resulting from the "raised confidence" in the accuracy of these reports. Presumably better decisions should more than compensate for the cost of professional accounting service.

For Limperg the social need exists and is independent of the actual profession. Once auditors arise to fulfil this need and are approved by society to do the work, the freedom of the auditing profession is constricted. Society expects the function to be performed properly and expects audits to be professionally made. It is argued, for example, that a partial audit or qualified report is not satisfactory. The explicit qualification may indeed show honesty and integrity on the part of the individual auditor, but the result does not fulfil the social need - the basic function - and it is the responsibility of the auditing profession to do its work correctly and justify the expectations it creates. It is not the responsibility of the public users of the audited statements to decide in each case how much confidence is lost as a result of the specific exception, i.e., how much to "discount" the usefulness of the

---

[5] Thomas Limperg, Jr., "The Function of the Accountant and the Doctrine of Raised Confidence," Maandblad van Accountancy en Bedrijfshuishoudkunde, February, October, 1932 and October, November 1933.

representations. (Unfortunately, this line of thought led him to support the hundred-percent audit precisely when the future of such audits was already doomed.)

Limperg thus developed a general approach to independent auditing with an ideal standard for judging the quality of its output. Two problems remain. First, how does one go about appraising the behavioral reactions of report users so that proper expectations may be aroused? Second, does the responsibility for inciting proper expectations and creating confidence extend to private accountants?

Limperg did not devote much time to the possibility of different psychological reactions of report users. He seemed to assume that the educational process would provide enough uniformity in individual interpretations to justify his idealistic rule. Limperg, like so many other accountants, hoped that internal accountants would become professionalized sufficiently to accept responsibility for creating acceptable public expectations.[6] He expressed serious doubts about the possibility, but obviously rejected the view that internal accountants are lackeys for internal managers and completely subservient to their immediate superiors.

Independence was discussed by Limperg with sophistication. The "function" insists on auditors who are concerned with the expectations of outside groups and therefore requires professional independence from all groups who would profit from creating false expectations at any level. Any auditor who does not accept this objection is not independent regardless of overt relationships which may lead to presumptions one way or another.

Opinion and Other Specific Difficulties

There is a growing feeling that the public accounting profession may be heading for serious difficulties by giving an opinion whose scope is considerably broader than either the extent of the investigation or the area of competence. For a basis for further comments consider the typical short-form opinion.

> We have examined the balance sheet of X Company as of December 31, 19-- and the related statement(s) of income and surplus for the year then ended. Our examination was made in accordance with generally accepted auditing standards and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances.

---

[6] Thomas Limperg, Jr., "The Accountant as a Representative of Particular Interests," Maandblad van Accountancy en Bedrijfshuishoudkunde, September, 1927.

> In our opinion, the accompanying balance sheet and statement(s) of income and surplus present fairly the financial position of X Company at December 31, 19--, and the results of its operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.[4]

It should be observed that the term "consistency" is used to indicate some acceptable stability through time. "Consistency" in this sense must be related to things that are considered to be important. To be consistent, for example, in using the identical audit team period after period is hardly an important objective. The term "conformity" is used to indicate the usual meaning of "consistency." "In conformity with" presumably informs that the recognition and measurement rules actually used were not contradictory to the guiding rules accepted by the profession. It is difficult to improve on this part of the statement and its objective. The difficulties are at the practical level in that the guiding principles are so vague that it may seem to be difficult not to be in conformity with some of them.

It seems desirable to discuss in some detail the looseness of the guiding principles to which the reports must conform. Consider the auditor's opinion that $121,171.67 fairly represents the results of X Company's operations. For comparative purpose the following additional information is available.

1. Depreciation was based on the straightline formula applied to cost with the controller's estimates of useful life. The amount was $180,000.

    a. If depreciation had been calculated as above except for substitution of declining charge methods that are allowable under current tax laws, the depreciation would have been $160,000. The use of $R = 1 - \sqrt[n]{\frac{S}{C}}$ would have resulted in a charge of $ 140,000.

    b. If the calculations actually used had been applied to current replacement costs, the charge would have been $310,000.

    c. If the calculations that were actually used had been unchanged except for the substitutions of the plant manager's

---

[4] American Institute of Certified Public Accountants (Committee on Auditing Procedure), Codification of Statements on Auditing Procedure (New York: American Institute of Certified Public Accountants, 1951), p. 16. This statement is known as the standard short form; exceptions to the scope (first) paragraph should be noted, and the resulting modification of the opinion (if any) is noted in the opinion (second) paragraph.

   estimates of useful asset lives, the charge would have been $210,000.

   d. If the only change from actual computations had been the substitution of compound interest methods for the straight-line formula the depreciation would have been $220,000.

2. Inventories were costed on a moving average basis.

   a. If the average had been applied at the end of the period (i.e., "moved" at the end of each year), the reported profit for the year would have been higher by $5,000.

   b. If LIFO had been applied at the end of the year, the reflected profit would have been lower by $30,000.

   c. If FIFO had been applied, the income would have been greater by $25,000.

   d. Inventories with identified cost of $100,000 were thought to be bordering on obsolescence. Selling prices were estimated to be at least as high as costs, and no writedown was taken. If these items were written down sufficiently to provide for expected normal markup, the writedown would have been $15,000.

   e. Had direct costing techniques been applied reported income would have been increased $20,000.

   f. Cost or market combinations were not explored but they could induce substantial changes in reported income.

3. The reported "net" income was before income taxes. If the auditor had considered such taxes as an expense, the statement would have shown a "net" of approximately 50% of the amount actually reported.

4. Goodwill was not written off. If systematic amortization of purchased abnormal earnings over the life implied had been taken, the reduction would have amounted to $50,000. Organizations costs were treated in a similar fashion, and amortization based on varying estimates provided by different officers would have resulted in a profit reduction ranging from zero to $10,000.

5. Executive estimates regarding the proper percentage to be applied to past due accounts varied widely. A reduction of $7,000 was approved, but the estimates varied from $3,000 to $20,000.

Clearly the supervising accountant has adequate material for serious reflection. A few of the above alternatives may not meet the nebulous test of accepted accounting principles, but a large number do meet currently acceptable procedures and serve to emphasize the wide dis-

cretionary range over which the auditor may roam. The amazing feature of this entire situation is that the profession's integrity and judgment have been respected to the extent that any dependence whatever has been placed on its reports! Except for some recently stated major complaints that arise primarily from price-level changes, there seems to be little lessening of confidence in the public accountants' results. Serious financial analysts are seemingly astute enough to sift the useful data from reports and make "allowances" for other material. They are no doubt often mistaken in the magnitude of the allowances and certainly could be expected to operate more effectively with information that is more nearly comparable.

Perhaps the saving grace is the phrase, "applied on a basis consistent with that of the preceding year." At least, an attempt is made to preserve comparability from period to period with regard to individual firms. The looseness and variety of accepted conventions still makes inter-firm comparisons risky ventures, but the straight-jacket of "consistently applied" attempts to assure some degree of comparability for intra-firm comparisons and individual trends.

Consistency of behavior through time has interesting implications. Clearly such consistency is not an unmixed blessing. Consistency in unacceptable social behavior is not to be commended. Professor Sidney Davidson has emphasized that if this standard is applied to moral behavior, a higher ranking is automatically given to the steady sinner and lower virtue is assigned to those who are sometimes good and sometimes fall from the wagon. For accounting reports the case is not much stronger. In both cases prediction of future behavior is important, and both investors and probation officers should find stability in past behavior patterns useful in prediction. Perhaps the profession needs to adopt a modified approach that establishes a temporal order for reviewing consistency. Behavior must be examined first to find whether or not it conforms to the broader accepted principles. If it does not, correction is demanded before the consistency-through-time rule is applied. If the particular action does conform satisfactorily or has been corrected so that it does conform, the time-stability test is applied to encourage desirable actions.

An increasing number of accountants are concerned with the scope paragraph compared with the actual operations performed. One may begin by inquiring why such a paragraph is included in an opinion. It seems that this statement would be entirely superfluous in a mature profession or if all parties had confidence in the competence and integrity of the profession. Medical men for example, seldom enlarge their opinion by including a statement to the effect that they followed accepted medical standards. Giving approval to qualified opinions has the effect of forcing disclosure of the nature of and reasons for the qualifications. But such approval sanctions various grades of opinions and leads to confusion and to sneering remarks about "twenty-five-cent audits."

The scope requirement may amount to a communication device to keep members of the profession constantly informed of the importance of minimum standards. It also has some coercive effect on marginal members

of the profession by requiring them to include the scope of their investigation as an explicit part of their signed representations. Otherwise a simple signature should be sufficient.

The more urgent concern is that the opinion paragraph contains a representation of work done (scope and depth) that is not justified by the "standards" and "procedures" applied. Accountants give opinions covering financial position and periodic earnings, but they do not feel it necessary to have "competence" as an "appraiser, valuer, or expert in materials."[5] A balance sheet, as a statement of financial condition, must imply valuation rules of some sort. Widespread use of cost allocation rules as substitutions for value, and their adoption does not by-pass the problem of financial (economic) significance in some mysterious manner. The usual procedure for amortizing costs, such as the usual treatment of damaged, obsolete, and shopworn goods, must consider the decreased sales possibilities -- value -- of the goods. The fund-raising possibilities are a function of quantities on hand and also of the prices the quantities will command. These prices are in turn related to the quality of the stocks. It is important to know whether the gems are diamonds or zircons, and if the accountant is not "expert" enough to discriminate the two, he must himself rely on the independent opinion of an appraiser to insure that his own opinion is not worthless.

There are clues which point to the financial significance of receivables, fixed assets, inventories and research costs, and anyone who gives an opinion on management's representations in these areas should be prepared to take whatever steps are essential to form a competent opinion. The responsibility may be sublet to specialists or the contents of the accountants' training may be changed, but to disclaim responsibility is not an acceptable answer.

Digression on Sampling

Early auditors were accustomed to detailed audits (hundred-percent audits) that checked every entry and summary prepared by the bookkeeping staff. The payment of professional fees to have thousands of small transactions "vouched" is obviously a misdirection of society's scarce resources. Sooner or later those who pay auditing fees could be expected to exert pressure to reduce the cost of such duplication. Yet the retreat from the hundred-percent audit was comparatively slow. In the case of highly vulnerable cash the retreat was especially slow, but in the area of inventories, for example, the sampling techniques and evidentiary support

---

[5] The following statement, while carefully hedged, tends to deny too much, and, many feel, partially undermines the value of the opinion. "In no sense is the independent certified public accountant an insurer or guarantor, nor do his training and experience qualify him to act as a general appraiser, valuer, or expert in materials." Codification of Statements on Auditing Procedure, op. cit., p. 13.

were reduced below an acceptable level and subsequently had to be strengthened.

The general retreat from the detailed audit was carried on with inadequate statistical knowledge and proceeded on an *ad hoc* seat-of-the pants basis. In the early period it is highly doubtful whether the techniques of statistics were developed far enough to be very helpful. An interesting research project could be built around the adaptation of accounting sampling to the needs of non-detailed audits and the concurrent state of statistical techniques. Certainly quality control techniques and such helps as the Dodge-Romig tables were in use some time before they were adopted to auditing work. The developments in sequential sampling beyond the older double-sampling technique were picked up by the profession quickly through the writings of Vance, Neter and others. The available literature in this area is now voluminous.

The difficulties of defining errors are serious enough, but accountants must find a method of weighting the seriousness of various kinds of errors. For example, failure to countersign a check may be extremely important as an indication that internal control has broken down. But is this error as important as a mistake of $100 in the amount of the check? The newer subjective (Bayesian) approach to statistics with its provision for assessing utilities and incorporating new knowledge in a systematic fashion offers help to the auditing profession. Some integration of these techniques is now being done in the cost accounting field and may be expected soon in auditing.[6]

There is a related and unsatisfactory area of accounting where the statisticians has so far offered little help. When fixed assets and inventories and research costs are relatively unimportant, the accountant's income reports are comparable enough from period-to-period and from firm-to-firm to be satisfactory. At the other extreme, the X company illustrates the futility of reporting a net of $121,171.67 when different sets of judgments or conventions yield fantastically different amounts. Conventional reporting is therefore deceiving because in some lines of business the reporting error is low while in others the possible error is tremendous, and no indication (other than knowledge of the business) is given of the differences in reliability.

In some cases the problem may be solved in part by putting an *addendum* to the operating statement or by using a columnar form with the effects of varying assumptions indicated. In most cases it would not be feasible to show statements for all possible combination of assumptions. In these cases the effects of many minor variations may be disregarded, and a number of firms have indicated by means of appropriate notes to the statements differences in net if alternate assumptions had been used.

Similar procedures may be applied to the financial statements. In fact, traditional methods for handling appraisals tend to accomplish

---

[6] See, for example, Charles Horngren, *Managerial Cost Accounting*, (New York: Prentice-Hall, Inc., 1961).

this end, and the inventory difference between LIFO and current market is sometimes indicated.

Some accountants, have recommended that the range of executive estimates be indicated on such matters as depreciation and inventories. In this case a reported profit of $100,000 followed by $80,000 - $150,000 would indicate that the consensus (or strongest personality) indicates $100,000 but that estimates range between $80,000 and $150,000. This suggestion has merit and when combined with supplementary information regarding the use of alternative methods of inventory costing, depreciation bases, etc., could be useful to many groups. For new concerns progress reports in discussion form may prove to be more useful than formal income reports.

A few half-hearted attempts have been made to apply probable error techniques to these matters, but the accounting process for generating data hardly fits the usual assumptions. Applications of normal variate techniques to test for bias run into similar difficulties. Many accounting measurement rules and definitions have built in bias while others do not. Changes in the "mix" of such rules is only one of the difficulties involved, for the weighting of errors for relative seriousness has not been solved.

Methodological Suggestion

The balance-sheet audit has had a definite association with single-entry bookkeeping. The common practice in the early years of auditing was to establish the existence and measure of the assets, liabilities and ownership contracts at the cut-off date and to base the opinion on earnings primarily on changes in proprietary amounts at different dates modified for dividends and additional investment. Secondary support was sometimes gathered by "scanning" the operating accounts. If this approach to auditing is combined with refusal to accept responsibility for discovering fraud, there seems to be no reason to get excited about internal control, efficiency, and internal misdirection of organization resources. A strange position! Major frauds and inefficiencies obviously affect the attainment of goals, but if a "certified" statement of financial status is the only concern, fraud discovery is of no consequence and internal control is important only to the degree that the figures may require less outside checking.

The following recommendation shifts the emphasis from an audit oriented toward presenting a balance sheet to an audit based on performance toward budgeted plans. While the emphasis is on operating accounts, financial matters are not neglected. In effect the recommendation is that the firm's budget be "adjusted to level" and its adjusted figures used as standards from which deviations are noted and investigated. If no budget is presented, the auditor may prepare a skeleton budget based on past performance and fixed-variable breakdown techniques. This constructed budget may be adjusted to actual sales or actual physical volume and used as a standard from which exceptions are reported and investigated.

For an illustration consider a firm that has no formal budget or standard cost system. The focus of attention for the early part of the audit would be in the area of sales. It would be necessary to audit the sales in some detail so that an opinion as to the actual sales volume can be rendered. In addition it may be necessary to work out overall percentage price changes for each major group of items sold. Even before the formal audit begins the staff can prepare provisional breakdowns of costs into fixed and variable portions so that their behavior in response to changes in sales or physical volume can be estimated. The results of past periods may be used as starting positions, and some attention can be given to accounts themselves so that the balances are analyzed and classified into relatively-fixed, relatively-variable divisions. Before the structure is related to the current period some attention must be given to changes in cost efficiencies and in the unit cost of services acquired by cost transactions. This work requires an overall appraisal of technological change, as well as wage and material price changes.

After the cost behavior has been estimated and the sales have been audited, the auditor may break the sales into volume and price variations along the lines of the old "gross profit variation analysis," and an estimated earnings report for the period may be prepared according to the budgetary formulas. It should be observed that the budget is prepared by applying the formulas to the period that is to be audited and not to the future as is the case in orthodox budgetary procedures. The resulting "formula earnings report" may be used for a standard from which exceptions may be measured, appraised, and investigated. Variations in labor, materials, power, various selling or administrative expenses may be significant and call for special investigation or they may be essentially in line with expectations. Unusual charges for revenue expenditures would show up immediately.

It should not be inferred that the audit is over when such exceptions have been resolved to the auditor's satisfaction. The opinion also applies to the statement of financial position, and obviously the auditor must assure himself that the items of the position statement are substantially correct. From the budget of sales and related items it is possible to construct the estimated charges to receivables, and an extension of budgeting techniques to include collection experience helps establish the estimate of credits to the accounts receivable control. Thus it is not difficult to set up a tentative figure for receivables to serve as a basis for checking exceptions and for disclosing large discrepancies. Notice that a careful audit of the sales figures is essential, and notice also that in connection with the sales audit the debit to receivables would ordinarily be checked as it is in ordinary auditing procedures. A study of the collection experience of the firms should help to build up a part of the budgeted cash position.

It is possible to approximate material and other requirements by applying budgetary procedures that start with operating ratios. With beginning inventories determined with satisfactory evidence, it is then possible to judge whether the purchases as represented by management are

consistent with the final inventories as stated. Consistent amounts in these areas in conjunction with inventory observation reports should cut the detailed work considerably. In these respects the recommendations are essentially those used in current auditing practice. The difference is primarily one of emphasis, but changes in operating effectiveness are disclosed and audited as a part of the usual auditing process.

SOME BEHAVIORAL ASPECTS OF ACCOUNTING

"Every society keeps the records most relevant for its major values."[1]

One of the most interesting and vigorous developments of the post-war decades has been reflected in the behavioral sciences. This development is a combination of sociology, individual psychology, anthropology and group psychology. An offshoot of considerable interest to administrators and accountants is known as organization theory -- a secondary synthesis of aspects that seem appropriate to associations and groups.

Psychology in various forms had long been an important element of the business scene. Traditional personnel psychologists have been with us for decades and have been working with testing, selecting, classifying, and predicting performance, but as Haire states they seem "...to have stalled on the problem of selection and classification."[2] Industry has had its quota of engineering psychologists, who have been concerned with finding the abilities of the workers, finding the requirements of the job, and then designing machines and establishing work conditions that tend to optimize the correlation of the two. This type of psychology tends to concentrate on the conditions of work (the environment) and has developed the macabre name of "human engineering." Haire states: "the 'human relations' movement is largely a program of development of attitude among leaders to manipulate the 'climate'....stemming from the early Lewinian suggestion that it is easier to reorganize the structure of the whole group than to change the individual..."[3]

Haire is not alone in asserting that business is behavioral science: "a sample of behavior in a particular context." Accounting is the leading form of communication-and-control language of business, and it would seem to follow that accountants should be at home among the concepts of psychology, sociology, and the behavioral sciences in gener-

---

[1] Paul F. Lazarsfeld, "Sociological Reflections on Business: Consumers and Managers," Social Science Research on Business: Product and Potential, by Robert A. Dahl, Mason Haire and Paul F. Lazarsfeld (New York: Columbia University Press, 1959), p. 108.

[2] Mason Haire, "Psychology and the Study of Business: Joint Behavioral Sciences," in Social Science Research on Business: Product and Potential, op. cit.

[3] Ibid., p. 81.

al. The truth is that accountants have almost no such knowledge, have developed little rapport with these related fields, and have made some fantastically naive behavioral assumptions (along with some reasonably astute ones). It is the purpose of this essay to point out some areas in which accountants must make behavioral assumptions and to emphasize the numerous instances where accountants have "solved" the problem by default. The essay is concluded with a brief and elementary survey of selected problems in the field of psychology.

Currently the accounting profession is hard pressed to keep control of the information gathering and reporting aspects of enterprises, and accountants need to ask more and more what can be learned and absorbed from competing information-control systems. Whom do businessmen listen to? How do they evaluate information for accuracy and appropriateness? How do they reach decisions? Do they, for example, use unfilled orders more frequently than past delivered sales? How are current production figures used? What sort of rumor and gossip network is at work and how is it used to supplement other information? What officers or executives are in charge of competing information systems and what do they emphasize? Where do the information services overlap? How do competing groups gather, present and control their data? What have statisticians to offer? How can their developments be integrated into accounting? Perhaps one should look at it the other way and ask how accounting can be absorbed most readily into the field of statistics. Whichever way this particular decision~~s~~ goes is relatively unimportant. What is important is that accountants and statisticians deal with information that is relevant to the needs of individuals and society. Only then can one meet competition in the area of gathering, sifting, classifying, and finally reporting information in meaningful ways.

A vast number of questions in the acknowledged field of accounting are based on psychological foundations and require some knowledge or assumptions before they can be discussed intelligently. David Green Jr., has emphasized this relationship by referring to accounting as the mathematics of behavioral science. Only a few of the possible points are mentioned here. The reader may wish to prepare his own list, it may well be a long one.

We may start with the field of internal control and system design and review our previous discussion by asking again how important and deterring is the need for collusion.[4] In fact, this essay might be composed entirely of a series of questions. How important is it to make

---

[4] To my knowledge the only published work worthy of note in this field is Donald R. Cressey's Other People's Money (Glencoe: The Free Press, 1953). Cressey digested some of the contents in "Why do Trusted Persons Commit Fraud?" The Journal of Accountancy, November, 1951. A perceptive review of the book by Arthur M. Cannon may be found in The Accounting Review, January, 1956. According to Cressey one of the preconditions for embezzlement is the "non-shareable" situation that cannot be discussed with others. This feeling of non-shareability in turn is probably related to the image that the embezzler has of himself.

opportunities for personal friendship with other key personnel difficult? We often try to separate, for example, the stores bookkeeper as far as feasible from the broad-shouldered men who handle the physical goods. Perhaps there are status barriers which are in themselves sufficient, and white-collar-blue-collar is enough. Does the deterrent stem in part from a feeling of rejection by a friend, an acquaintance from a lower status-level, from a stranger, loss of face in the neighborhood? Perhaps it stems from the fear of losing the job? From the fear of being disgraced in the firm or community? From fear of blackball by all firms in the region? From fear of prison? Do accountants have any answers to these questions? Accountants assume that documents from other concerns (e.g., invoices) are better evidence than documents generated internally. Apparently the assumption here is that an interfirm barrier has additional deterrent properties. Most accountants feel that it does, but why? How much? Is it geographical? What about the internal control of the other firm? Certainly the barrier is not homogeneous among all organizations.

We have only begun to ask questions about which accountants have expressed only the vaguest feelings. For example, how much extra protection -- if any -- does adding a third collusive party, or a fourth, or a fifth, add to a system of internal control? Does it make a difference whether the person who would share guilt is a male or a female? Young or old? Mexican or Irishman? Bumpkin or urban slicker? Is the fact that the firm is profitable or unprofitable a consideration? Does the wage rate make a difference? If so, is the rate relative to other wage rates in the firm or in the community a factor? Or is it the rate relative to the level of living desired? Is union loyalty involved? What about prestige factors? Positions of status and role? Can loyalty to the organization be isolated? If so, how does it function as a deterring force? Does anyone care to defend the existing procedure for appraising internal control?

The point to be emphasized is that accountants, as scientists, should have hypotheses covering these points, and should have attempted to scale the relevant variables, measure the effects, isolate critical and discontinuous points. Our current training and educational requirements for the profession are woefully inadequate in these areas. Most of us are simply not competent to appraise the adequacy of internal control and therefore to plan an acceptable audit program.

The systems problem has wide applications to the general society in which the employee lives. For example, does the difficulty or ease of

---

Being in a trusted position with dignity and prestige helps establish the image that in turn will not let him share the trouble. With smaller items and at lower prestige levels, the problems may sometimes be shared more readily and rationalized more effectively over beers at the local pub. See Essay 4 for further comments on Cressey in connection with auditing.

installing an accounting system depend on the degree of organization or regimentation in other sectors of the workers' lives? Does the regimentation of an accounting control system lead to respect for authority? To disrespect? No effect? Can one generalize at all? The rapid growth of industry in hitherto backward countries may make such questions practical and relevant. Does a system tend to lead to bureaucracy or to authoritarianism? Is there a feedback chain from system to organization to system? How do we instill a sense of values (educate) to get those who fill in reports to be accurate? Does it make a difference if they are production workers who are not in the accounting chain of command and have no tradition for accuracy in reporting? How does one go about setting up devices to check the accuracy and consistency of these sub-reports within the usual cost constraints? How important is the ease of evading responsibility? Can we construct some sort of coefficient of buck-passing possibilities? How could it be set up? Can the tendency be reduced or controlled? These questions are directly related to accounting, and there are many similar questions that are now being investigated by those in management, personnel, and organization theory. For example, what difference does identification with blue-shirt or white-collar make? In what ways and to what extent does identification with the management group change attitudes toward accuracy of reports and conformance with organizational goals?

Some mention of embezzlers is made elsewhere, but how important is their perception of the probability that they will be discovered? How important is the fear of punishment and the expected value of the resulting misery. Perhaps the expected value of the pleasure of having the stolen funds can be approximated. Is there a middle ground between being caught and being above suspicion, e.g., a stage of fear not of punishment but of being suspected? Is the approval of the auditor as an individual or as a professional a factor in honesty or accuracy? Is approval of the auditor a bigger or smaller factor as we go up or down the line to the controller? Our answers are meager indeed!

Let us now turn to some behavioral aspects of income reporting and their effects on investors and members of the firm. Again there has been less work in this field than is desirable, although there have been some serious studies of investor motives and reactions.[5] Consider, for example, the following types of questions. What differences in investment

---

[5] The following sample is only suggestive. Myron J. Gordon, "Dividends, Earnings, and Stock Prices," The Review of Economics and Statistics, May, 1959, pp. 99-105, and "Corporate Saving, Investment, and Share Prices," Currently unpublished. J. Hirshleifer, "On the Theory of Optimal Investment Decision," The Journal of Political Economy, August, 1958, pp. 329-352. Franco Modigliani and M. H. Miller, "The Cost of Capital Corporation Finance and the Theory of Investment," The American Economic Review, June, 1958, pp. 261-297. James Tobin, "Liquidity Preference as Behavior Towards Risk," The Review of Economic Studies, February, 1958, pp. 65-86. James E. Walter, "A Discriminant Function for Earnings-Price Ratios of Large Industrial Corporations," The Review of Economics and Statistics, February, 1959, pp. 44-52.

action result if value increases are reported by means of footnotes instead of treating them as income and showing them on the income report? Notice that normal tests for income realization require an increase in working capital at ~~best~~ least equal to the recognized increase in value before the change is shown as income. What are the resulting changes in demand for dividend distribution? What are the effects of showing current appraisals in the accounting reports? Do investors and owners tend to treat such increases as income? Capital gains? Adjustments for changes in the measuring stick? Are reactions different for each interpretation? If so, how much and in what directon? Are devices for smoothing income a blessing or an "artificial tinkering with profits"? How do businessmen respond to higher reported earnings? Does tolerance for inefficiencies increase? Does bargaining resistance to non-profit sharing groups decrease? If so, how much? Do owners invest more rapidly and managers expand facilities more quickly? Or do they have some sort of internal stabilizer to smooth or to discount the accountant's reports? A good part of the LIFO controversy and the current discussion of price-level adjustments requires knowledge -- ~~or~~ or in the absence of knowledge -- assumptions on these points.

Expected reactions to stability enter into the arguments about clean surplus and all-inclusive income reports. Many businessmen in the past must have assumed that reported profits are influential. At least many have used the back-door (the surplus route) to obscure unfavorable events. Yet perhaps accountants are sanguine, as one professor has always stoutly maintained, in believing that investors and businessmen look at the profit figure at all except to estimate the amount of probable income tax. Accountants should not only know such things; they should be able to specify the conditions in which reported income does matter to each group, and they should be able to indicate the relative importance of the fund backlash from inverse tax payments. That such things can be known exactly is too much to expect, but accountants may be able to isolate critical points and reach conclusions with accuracy rated in probabilistic terms. It should be possible to go further and point out attitudes and errors in judgment that affect only a transfer of wealth, e.g., more for one individual and less for another, and those that bring about a misdirection of society's resources.

A simple question to start an investigation could be: What are income figures used for and by whom? In the early days of accounting, for example, income was assumed to be an index of the amount that could be withdrawn from the organization without impairing capital in some sense. A modern variation is similar in that income is regarded as a guide for consumption. Certainly reported past income influences expectations and is related in some fashion to the price of securities or to the worth of ownership interests. Unfortunately, here as elsewhere there are intuitive feelings but few careful studies and little confidence in the results of such studies. For example, how interested are the holders of fixed-interest obligation in times-interest ratios and retained earnings as support for their position? Do these creditors have critical points that stir action when the times-requirement ratio is above or below some subjective standard? Such a ratio may become extremely important to a firm's survival.

How do employees at different levels react to reported profits? Do they look at high income figures as signals for more rigid bargaining for more wages, bigger bonuses, and better conditions? Do they think of high earnings as a factor in job security through membership in a succesful organization? Is pride in succesful operation as evidenced by profit a factor? Do they identify their own efforts and contribution with the amount of reported income? How do reactions of governmental agencies differ? Do assessors consider earnings in assessing property taxes? Is there a more or less continuous relationship between reported income and assessments? If so, is the relationship direct or is it due to common causes such as larger inventories, etc? What about suppliers and customers? To what extent do they tie their interests to one supplier or firm? What penalties does a customer suffer if a supplier folds? What are the penalties attached to making changes? At what point do customers tend to leave a supplier who is in distress?

The income figures are, of course, not the only amounts of [illegible] interest on income reports. How do readers use sales returns data, for example? In spite of some obstruse and lengthy arguments the important issue is not where sales returns belong on the income report. Who follows returns, allowances, rebates, kickbacks, etc.? At what level of authority does he operate? What are his action points and how are they determined? Does someone in the organization investigate such relevant factors as poor packing, impossible delivery dates, misleading specifications and qualifications, careless writing of orders with wrong addresses, etc., poor quality, over-selling in the sense of shipping with only faint hope of permanent acceptance? Do businessmen interpret gross profit as the contribution over variable costs and tend to think of expenses as relatively fixed costs? Which officials follow inventories and how do they set action points and what actions do they initiate? Does the usual expense classification of administrative, selling, etc., have meaning to anyone? How is the overall maintained gross margin figure used and how is it tied in with individual margin figures?

There is a feeling among many accountants that item location on the reports has genuine importance in getting desirable or undesirable action. If, for example, position is an important motivation factor, it would seem to follow that the form of the report should change from period to period in response to the things that most need to be done. Thus, in one period it may be desirable to start with purchase returns. Accounting reports are specialized statistical tables and are subject to the same criteria of usefulness. Moreover, our measurement and decision rules would seem to be variable in a similar way. To be set against this variable approach is the fact that usefulness and prediction are often aided by some degree of uniformity in measuring and reporting. Clearly there is an optimizing problem involved, and it may be considerably less expensive to educate users to interpret imperfect general-purpose reports than to tailor the reports to the probable reactions of each reader.

Now and then accountants argue the merits of treating sales discounts as direct sales deductions as opposed to treating them as selling or administrative or even financial expense. Advocates of each classification usually have no personal (self-interest) motives and are sincere about their beliefs. What objectives are involved in arguments of this

kind? Do the "principles" of accounting call for this type of classification in order to be consistent with broader objectives? Perhaps an accountant feels that sales discounts do not meet the definitional requirement for expenses. If the definition of 'expense' is acceptable it is clear that preservation of consistency with such useful definitions has positive merit in an information-reporting system. Accountants must appraise the possibilities of various alternatives, assign appropriate utilities and then devise appropriate definitions.

There has been systematic effort to appraise the impact of some alternate measuring and reporting schemes on investors, creditors, owners, bankers, and others. Within the last decade or two there has been some opinion (in the tradition of Schmalenbach) to the effect that the balance sheet is of little or no use and is merely a list of unallocated costs and another list of possible claims that in aggregate probably never will be paid. Some other discussions have characterized the balance sheet as a glorified statement of fund sources and dispositions from the inception of the firm. This is an interesting approach, but one should ask how, precisely, is this report used and exactly, for what purpose? The balance sheet viewed as the "big picture" of the current liquidity situation is more familiar, but again we are woefully weak on details. There is a well-developed folklore about the two-to-one current ratio with the result that this fraction probably has more psychological impact than its merits. Is a ratio of four considered to be twice as good as a ratio of two and does a ratio as large as four put curiosity at rest so that no further attention is directed to the liqudity problem? Little is known about measuring the impact of such devices on behavior. Some may have acceptable-non-acceptable or go-no-go application while others may be represented by relatively smooth functions.

For a further example does anyone use the imperfectly preserved distinction between total contributed capital and non-contributed capital, or capital contributed by preferred holders and capital contributed by residual holders? Are current preferred holders interested in what a previous generation of preferred holders probably contributed? The classification of stockholders' equity in terms of legal restriction may have more merit, for, traditionally, voluntary retained earning restrictions were a device for disclosing general intentions, vague fears and sundry anxieties. Accountants are not positive about general reactions to such items as reserve for contingencies or reserve for reconversion, and there is little information about attitudes toward more specific reserves. What is the meaning to the financial public of a large retained earnings balance? Does it lead to the expectation of continued parsimony in dividends? Larger future dividends? Careless or optimistic bookkeeping? A substitute for specific disclosure of expected unfavorable events? It is difficult to realize also that nearly nothing is known about investor attitudes regarding capital surplus, revaluation and price-level credits, donated surpluses, surplus restricted for treasury stock acquired, etc. The misconceptions of the average investor about ordinary retained earnings should provide interesting and enlightening research.

The views held by various segments of the financial public with regard to book value and its meaning might also prove to be interesting and useful. Many accountants themselves have apparently given up on book value and are still undecided whether the figure is one that is appropriate for liquidation or for a continuing concern. One solution is to abandon attempts to give meaning to such a ratio as book value per share. There is no necessity for finding guidance and meaning in every possible ratio, remainder or total that might be constructed from accounting data. Yet there must be an important difference between a firm that uses many valuable assets to earn a given return and another firm that uses only a few assets to earn an equivalent return. Do investors believe that an allowance for depreciation equal to one half the cost indicates that the assets have yielded one-half their expected benefit? One might ask many accountants the same question with interesting results. The point to be emphasized is the almost complete lack of knowledge about the reactions and desires of those who use the output of an accounting system.

Comments on Stedry's Budgeting Model

We have some examples of how research in the psychological aspects of accounting control may be carried on. On such study by Andrew C. Stedry deserves extensive comment.[6] This study does not measure the magnitude of the variables and constants involved, but it does set up a model that may be used as a framework for thinking in this area. Such a model is clearly a preliminary step that must be made if accountants are ever to get beyond such attitudes as: "tight but not too tight," or such inane statements as: "Don't put the carrot too far in front of the rabbit." The Stedry volume deserves careful study for its methodological structure. The mathematical ability necessary for understanding is moderate; in fact the mathematics does little more than provide a convenient notation.

Stedry borrows the concept of aspiration level from Lewin and his associates and uses this concept effectively as a core construct for his model.[7] The aspiration level is an intervening variable operating in

---

[6] Andrew C. Stedry, Budget Control and Cost Behavior (Englewood Cliffs, N.J. : Prentice Hall, Inc., 1960). See also Richard Mattessich Budgeting Models and Systems Simulation. Working Paper No. 20, Management Science Group, Institute of Industrial Relations, Berkeley, California.

[7] Lewin states: "Experimental psychology has shown that the formation of goals depends directly upon the laws which govern the level of aspiration particularly upon the effect which success or failure has in raising and lowering the level of aspiration. These experiments make it evident that the level of aspiration is greatly influenced by such social facts as the presence or absence of other persons or by the competitive or noncompetitive character of the situation. It has been shown, too, that the goal-setting depends upon certain ideal goals, upon what the

conjunction with budgeted levels, which are set by higher management, and expected actual levels. With the aid of this set of relationships, Stedry then proceeds to set up some hypotheses that are subject to empirical tests, review some of the literature, and speculate about the determinants of aspiration levels.

The following assumptions and hypotheses are paraphrased or quoted from Stedry as an example of his behavioral approach.

> The discrepancy between the expected actual level of expenditure and the aspired level of expenditure is appropriately termed a measure of *stress*, since clearly the department head's "emotional tension produced by frustration," varies with the size of the discrepancy. A compromising of goals is a well-known reaction to stress...." (p. 25).

It is hypothesized that the existence of a discrepancy between expected actual and aspired levels will often lead the department head to try to reduce the discrepancy by moving the aspiration level toward expected actual at a rate dependent on the size of the discrepancy. Stedry assumes further that in addition to the effect above, the level of aspiration will be lowered as a consequence of lowering the budget level (imposed by outside authority). Further, department managers will be encouraged if the discrepancy between expected and aspired expenditures does not exceed some positive number or band designated as the discouragement point or area. In addition to the discouragement point there is a larger positive value which may be called the failure point. When the discrepancy equals or exceeds this point the department head resigns. "The neurotic response of extreme discouragement will eventually lead to ultimate withdrawal...." (p. 26.) If the department head is encouraged, on the other hand, he tries to make the discrepancy smaller by lowering his expected actual level, and Stedry feels also that the manager's reaction to a negative discrepancy is to let the expected actual level rise. In each case he suggests that the rate of adjustments depends on the size of the discrepancy, but of course this assumption requires empirical testing. "If the department head is *slightly discouraged*, he will reduce the discrepancy by reducing expected cost at a lower rate relative to a given discrepancy than he would if encouraged. If he is *moderately discouraged*, he will allow expected cost to increase but at a sufficiently small rate that the discrepancy will not be increased. If he is *extremely discouraged*, he will allow expected cost to increase at a rate which increases the discrepancy." (p. 25)

---

sociologists call the 'ideology' of the person....emotional reaction to failure can be changed to a great extent by appropriate praise or change in social atmosphere....management of tension by the individual depends upon his particular social and cultural setting." "Field Theory and Experiment in Social Psychology: Concepts and Methods," *American Journal of Sociology*, 44 (1939), pp. 862-896. Reprinted in *Readings in Philosophy of Science*, ed. Philip P. Wiener (New York: Charles Scribner's Sons, 1953), p. 221.

From the framework or model set up by Stedry it is possible to organize inquiry in a systematic fashion. One may ask for example what means and channels are available for the department head to improve his expected actual level and thereby cut down the discrepancy from this angle. Perhaps diverting effort from non-organizational needs or non-objectives to organizational goals can be accomplished and thus help to cut the amount of discrepancy without giving rise to too many other forms of managerial stress. Improvement can arise in a number of ways including the general desire to work harder, the increased feeling that costs are objects of concern and that they matter.

While these kinds of things have wide application in the field of getting the world's work done, it should be clear that they have particular importance for what is now known as the field of budgeting. It appears that a mechanistic approach to the budget in which performance is related primarily to technology does not account adequately for differences in aspiration levels and reactions to stress. However, it is usually not feasible to tailor all budgets, requirements, standards and goals to every member in the organization. Contrary cost functions are at work here and there is an optimizing problem in which the advantages of tailored budgets are matched against the sacrifices in making them. Usually this problem can be solved on a marginal or incremental basis with due caution for possible conflicts in "optima in the small" and "optima in the large," i.e., sub-optimization.

The question of budget strategy involves individuals, and the possible effects of budget paraphernalia on aspiration levels, stress, on expected actual costs and finally on actual costs are a part of the process. Stedry concludes that technological constraints must be considered but a stationary budget that is never attained tends to lose effectiveness and be replaced by some other de facto element of control. If such a budget is attained the possibility of lower cost or better performance is never answered. "...blanket budget reductions...are of dubious merit. Furthermore, the treatment of all subordinates 'impartially' when it comes to budget demands...regardless of their motivation structure, appears not only irrational from the cost standpoint but from the standpoint of welfare of the subordinates as well..." (p. 41). With regard to implicit (de facto) budgets Stedry argues that: "...merely because a systematized and formalized procedure is absent supervisors...do not then believe that others...hold no expectations concerning their behavior....the essence of the budgetary control procedures is formulated around such 'external' expectations which become crystallized as a stated goal when formalized in either a budget, a physical or cost standard..." (p. 70).

There is little doubt that the budget imposed from without is an immediate factor in setting aspiration levels, and it is reasonable to assume that as a long-run proposition the aspiration levels indirectly and over a long period tend to influence budgets even when imposed from without. It is usually assumed that the aspired level is influenced by positive or negative awards associated with attainment or nonattainment of the budget. These relationships need considerable work, for their interaction is by no means simple. In some cases the awards are in terms of

normal satisfactions that are cared for outside the area of work experience. Certainly the reaction cannot be assumed to be straight line or represented by the usual curves for marginal diminishing satisfaction. Short-run and long-run may conflict in that a good performance today may bring an immediate reward (and improvement) but in the long-run will lead to tighter imposed budgets that will make future bonuses difficult to earn.

There has been a substantial amount of laboratory work devoted to aspiration levels and their determinants, but much work remains. Stedry points out that: "...work in the laboratory has concentrated on descriptions of the formation of goals, taking performance as the independent variable, rather than manipulating performance through the effect of aspirations and external goals....The experiments...have generally dealt with the precise interpretation of 'level of aspiration' in various contexts and casual factors in shifts of the aspiration level. The casual factors investigated include social and personality factors as well as temporary situational factors." (pp.43-44,50).

Lewin and his group have defined the difference between an aspiration level and the *actual* score as the "achievement discrepancy," and the difference between the aspiration level and score on previous tests as "goal discrepancy." When change in performance is small the goal and achievement discrepancies may be assumed to be identical. Chapman and Volkmann concluded that their experimental subjects did not change their levels of aspiration in response to announcements as to how other groups were doing, and Stedry (p. 46) concludes that: "...the experiment casts serious doubt on the possibility of affecting the aspirations of one department head by pointing out the achievements of another."[8] Some work by Wolfe and others have shown that for some animals (notably chimpanzees) the timing of the reward and the manner in which it is given along with the amount of the reward are factors in goal setting. There is some evidence that aspiration levels fall after failures in previous efforts and rise in response to previous success.

Stedry concerns himself with another problem of consequence for budgeting, i.e., the possibility of strong reactions to showing red variances of any kind and the desire to show black (favorable) variances even at great cost. Thus it is possible that the division between meeting and not meeting a standard is akin to passing or failing a course of study. It is possible that organization interests may be sacrificed sharply in order for the individual department head to look good by avoiding the stigma of red variances -- failing no courses. An analogous student prefers all D's to all A's and one F. All standard-cost systems are vulnerable to those who are willing to sacrifice more remote goals to make their own variances look better. Such sacrifices may be disclosed

---

[8] Dwight W. Chapman and John Volkmann, "A Social Determinant of the Level of Aspiration," *The Journal of Abnormal and Social Psychology*, XXXIV (1939), pp. 225-238.

in the course of analyzing variances, but intervention by superiors is sometimes necessary. From the view of the individual department head the intervention rules are essentially servo rules, and it is extremely difficult to discuss the setting of aspiration levels without discussing what the subject perceives the intervention rules of his superiors to be and how he judges the expected consequences of failure. In some actual studies knowledge of goals seemed to stimulate output. Worst performances were generally turned in by groups that did not formulate their aspirations. Considerable evidence has been turned up that feedback in the sense of knowing how they did on previous tries was extremely helpful. Success or failure previously on related tasks obviously have an influence on current aspiration levels, but the effect is hard to generalize and measure. Clearly competent workers should be operating in these areas, and accountants, like Uriah, should be among them.

Comments on More General Psychological Matters

Within the last few decades psychologists have taken an approach that is more in tune with operationalism and other tenets of scientific method and have placed less emphasis on such constructs as self, introspection, mind, and other terms that call for nonoperational constructs and lead to in "...engtanglement with dualistic metaphysics."[9] With regard to mind, for example, the modern trend is away from the "bucket" theory (the term is Popper's) of Hume to a modified Kantian approach: "...knowledge is not a collection of gifts received by our senses and stored in the mind as if it were a museum, but...it is very largely the result of our own mental activity;...we must most actively engage ourselves in searching, comparing, unifying, generalizing..."[10]

---

[9] Egon Brunswik, "The Conceptual Framework of Psychology," International Encyclopedia of Unified Science (Chicago: University of Chicago Press, 1955), p. 659. This section leans heavily on Brunswik, who states: "Since sensory experiences are usually supported by the presence of an external stimulus, they are sturdy and persistent in comparison with emotions, imagery, and thought. They withstand observation better, and there is greater conformity of report from subject to subject." Ibid., p. 663.

[10] Karl R. Popper, The Open Society and Its Enemies (Princeton: Princeton University Press, 1950). Reprinted in Readings in Philosophy of Science, op. cit., p. 358. Note the emphasis on mind as a "patterning of information" in the following. "The Darwinian continuity between man and the rest of nature has now been carried to completion: man's rationality marks only a difference of degree from other animals, and fundamentally, no difference at all from the machine....With communication and control as the key, a similarity of structure can also be traced between an individual (whether human or mechanical) and a society (again, whether human or machines in a well-designed factory)....The analysis of mind and individual personality as a structure of certain information processes renders

The current trend obviously is in the direction of adaptive behavior, but here again some changes have been made. The older approach with a unique response to a stimulus will no longer do in an age of causation defined in terms of repeatable initial conditions.[11]

The simple stimulus-response (S - R) approach has led to variations of "dynamic" psychology by Woodworth, who stressed such replacements as W -S-Ow - R - W, where O represents the individual and his drives, W for the world and w for the individual's "situation and goals set." Behavior is carried on as an adaptive operation with far from perfect cues in a heavy fog of gestalt-ambiguity. The reduction of search for strict laws and increased attention to probabilistic tendencies seem inevitable.

> Since behavior as an adaptive function is inherently bound to have its imperfections and occasional failures, the traditional nomothetic search for strict laws becomes an insoluble task....The degree of univocality of results cannot exceed the degree of univocality of behavioral achievements themselves...[12]

This non-deterministic, goal-striving approach is apparently the product of a number of able psychologists, but one of the acknowledged leaders has been Kurt Lewin. The following statement is again from Brunswik.

> In his "topological" psychology he [Lewin] attempts graphic representation of the cognitive and motivational central time-slice which he calls the "life space" or "psychological environment." This is in preparation for a "dynamic" analysis in terms

---

obsolete not only the 'mind substance' of the idealist, but mechanistic materialism as well. Mind is a patterning of information and not spirit, matter, or energy." Abraham Kaplan, "Sociology Learns the Language of Mathematics," *Commentary*, (September 1952), pp. 274-284. Reprinted *ibid.*, p. 407.

[11] Brunswik emphasizes that one of the attitudes fought by Gestaltists is the "...unrecognized 'constancy hypothesis'...taking for granted a one-to-one correspondence of sensory stimulus elements and conscious sensations..." He points out that in "...the inkblot test by Rorschach ...gestalt ambiguity is purposely provoked to throw light on the organization tendencies and personality of the responding observers." *Op. cit.*, pp. 662, 666.

[12] Egon Brunswik, *op. cit.*, p. 686. Brunswik appears to be less sanguine about the future of thinking machines than some and also not so enthusiastic about the use of decision rules. "... thinking machines can usually be built with a concentration on a few cues of maximal trusthworthiness and thus dispense with the services of cues of limited validity." p. 682.

> of hypothetical directional forces or "vectors" which leads to the development of laws allowing prediction of the future states of the system....The theory contains reference neither to the objective stimulus conditions nor to the motor execution and the further results of a response. The system and its laws thus remain confined to a postperceptual, yet prebehavioral, "contemporaneous field" ....The goals have different "valences," and the path to them is more or less "segmented" by "barriers" into gestalt-like unitary "regions"...which are anticipated to lie between person and goal....It is one of the assets of the system of Lewin that quantification of the life-space is rejected, and Euclidean, metric space replaced by the non-quantitative yet mathematical device of topological space based on relations of order rather than on measurement proper....topological representation may be the long-sought answer to the introspectionist dream of finding a mathematical, and thus univocal, "objective" means of communication for data of consciousness in spite of their intrinsic -- absolute or relative -- non-quantifiability.[13]

Followers of the organismic or holistic approach to psychology and of cybernetics attempt to explain behavior in terms of needs and objectives and take a teleological turn. Tolman has been a leader in the use of "goal striving" in psychological work, and has emphasized "persistence through trial-and-error" and "dolicity relative to some end."[14] Brunswik comments that "...a good part of psychoanalysis is devoted to the discovery of environmental conditions of quiescence which play the role of substitute goals or new terminal foci."[15]

The explanation of behavior in terms of terminal ends is sometimes known as "whither" explanations. These explanations are usually in terms of purposes, needs, desires, wishes, and have a tendency to push inquiry back a step to an examination of these purposes, desires, needs, etc., in order to find how they are fashioned and how they react to efforts to change them. It seems obvious that service professions such as accounting, law or engineering must be approached and analyzed in terms of whither explanations.[16] As opposed to the whither explanations, there is the so-called "whence" explanation that has historical elements and tends to find initial conditions and associated variables

---

[13] _Ibid._, pp. 735-737.

[14] E. C. Tolman, _Purposive Behavior in Animals and Men_ (New York: The Century Co., 1938), reprinted in _Collected Papers in Psychology_ (Berkeley: University of California Press, 1951).

[15] Egon Brunswik, _op. cit._, p. 717.

[16] The seemingly strange relationship that makes a purpose -- an effect -- serve as a cause has been pointed out by Max Weber. "From our viewpoint, 'purpose' is the conception of an _effect_ which becomes a _cause_ of an action. Since we take into account every cause which produces or can produce a significant effect, we also consider this one." _Op. cit._, p. 334.

(causes) so that explanations are forthcoming. In many cases for example the two cannot be separated. Clearly an explanation of accounting conservatism in terms of objectives may be related to a "whence" explanation in terms of the forces that have fostered the attitude.[17]

The assumption of a more active psychological unit (organism) than was formerly suspected now seems to be justified. 'Operant behavior' is currently used along with 'respondent behavior.' The resulting return to motivation may be, as Brunswik thinks, a considerable change from the older view in that a place is now made for the spontaneity of the individual. Brunswik laments the past tendency to treat organisms as closed systems and assuming that the second law of thermodynamics (increasing chaos or entrophy) and the principle of parsimony always apply to such systems. Instead, he argues that organisms need not exhibit the tendencies toward equlibrium inherent in closed systems, for he insists that they function in open systems in a "quasi-stationary steady state."[18]

The methods now most popular with psychologists seem to belong to the current successors of logical positivism. Much of the former talk about self and mind have gone the way of the "I" with the help of Carnap and the Vienna Circle, but the methodological positivism of some psychologists may indeed approach the "methodidolatry" suggested by Popper. The use of postulational techniques by Spence and others, the emphasis on functionalism by Dewey, the concern with measurement by Stevens and Torgerson, the concept of mind as a patterning of information, and other operational definitions, all are evidences that psychologists, like their brothers the economists, are returning to a reconsideration of theoretical foundations.[19]

Biologists and others are now approaching psychological problems through biology with a series of postulates and attempts to find and

---

[17] Sometimes the initial conditions are assumed and are not actually observed. According to Spence the result is "response inferred constructs." K. W. Spence, "The Nature of Theory Construction in contemporary Psychology," Psychological Review LI (1944), pp. 47-68.

[18] Egon Brunswik, op. cit., p. 667. Auditors should notice the change of viewpoint toward objectivity. "We may relate the concept of objectivity to what is known to the psychological statisticians as test reliability.... 'Objective,' then, is a class of responses yielding maximum reliability coefficients within or between individuals facing a common geographic situation or situational element." Ibid., p. 669.

[19] These interested in the history of psychology may wish to refer to: Psychological Theory: Contemporary Readings, ed. M.H. Marx (New York: The Macmillan Company 1951) or Readings in the History of Psychology, ed. W. Dennis (New York: Appleton Century-Crofts, 1948). A highly specialized review of the quantitative and measurement aspects of psychology may be found in Warren S. Torgerson, Theory and Methods of Scaling (New York: John Wiley & Sons, Inc., 1958).

specify the processes that lead to subjective states such as "pleasant," "desirable," "unpleasant." A group of logicians and mathematicians have been impressed with similarities of binary mathematics and computer design to the "firing" of a nerve. "Since firing in nerve elements follows an all-or-none principle and may thus be idealized as dichotomous.... neural events and relations among them can be treated by means of (two-valued) propositional logic in a strictly nomothetic manner..."[20] McCulloch and Pitts have pointed out the presence of feedback loops and have even suggested that the disjunctive features of choice at many points make it extremely difficult to reconstruct initial conditions or preceding states of the organism.

Rapoport, Shimbel and others have developed an approach that is based on the behavior of neurones in synaptic delays, threshold tendencies and probabilistic methods. Clearly most feedback is negative, but Brunswik points out a useful subclassification: "...McCulloch distinguishes 'appetitive' negative feedback devices, in which the 'circuit passes through regions external to the system,' from such simpler cases of feedback as the 'merely homeostatic' which keep some internal parameters of the system constant, or the 'servo,' in which the value of the parameter or end sought by the system can be altered from without the circuit..."[21]

The application of such concepts as feedback within closed systems and investigations of the accounting information necessary for intervention rules by human "servos" have received no attention. The movement toward automation should turn accountants toward the possibilities of collecting, classifying, and feeding back information without leaving the closed human (but mechanical-like) system. So far accountants seem to have abdicated this area, and development has gone by default to engineers, psychologists and communication theorists.

---

[20] Egon Brunswik, op. cit., p. 742.

[21] Ibid., p. 744.

NORMATIVE CONSIDERATIONS - SOCIOLOGY AND ETHICS

> It may be said that in commercial or investment banking or any business extending credit success depends on knowing what not to believe in accounting. (F.P.C. vs. Hope Natural Gas, 51 PUR (NS), 193-235.)

This essay contains some comments on the sociology of accounting in the sense of the interplay of accounting conventions with the social forces at work on shaping objectives and the means for reaching these objectives. The essay on simulating a profession is devoted primarily to the mechanics and procedures for introducing change into a profession and the possible reaction of professional conventions to the introduction of change. The current essay deals more with the purpose of accounting in social organization and the influence of social institutions on individual and professional behavior. When conventions grow up in response to purposes, those who apply the conventions are subject to responsibilities to see that the purposes are met. The coordination of these responsibilities, the arrangement according to worthiness and the search for inconsistencies and discrepancies may be included under the heading of professional ethics.

In a narrow sense, ethics is sometimes said to deal with the relation of an individual to a given code of some kind. Thus, if one is given the value judgments and codes of rewardable and punishable behavior of, say, the Kwakiutl he may be able to judge whether or not specified behavior is in accord with the codes. There is always the possibility of conflicting objectives in a given case and therefore the necessity to interpret the established hierarchy of values in order to settle a particular case. This approach tends to bring ethical problems into the domain of scientific method by establishing the laws governing the formation of value judgments and specifying operational rules for comparing actual behavior with the standards. Thus in the field of accounting one may accept for immediate purposes the code of ethics set forth by the AICPA, and within the usual limits of judgment decide in a particular case whether a given act or series of behavioral events is or is not in accordance with the code. This type of activity is difficult enough and is an extension of the usual scientific and legal problem of gathering the facts, establishing the evidence, interpreting the standard (code or custom) pinpointing the similarities and differences between the established action and the code, evaluating the variances, and finally rendering the decision. While it may be argued that the procedure depends too much on two-value logic and does not provide for enough stopping places in the grey area, the procedure has worked reasonably well through the years, and in fact has no rational alternative. One comment and

warning seems in order here. It appears at first sight that this type of procedure is largely mechanical and does not involve 'social welfare' and other related and vague generalities to get a decision. Such is not the case. We have only to ask: how are the similarities and differences between established behavior in a particular case and the standard measuring stick (the code) to be valued?[1].

The advantage of the above procedure is similar to that coming from the application of sequential sampling. If the cases are obviously alike or diverse, the decision is easy and the established hierarchy covers the case simply and adequately. The borderline cases remain, but one may be able to give a more and more complete code and thereby partition the fuzzy area again and again. Certainly this area of fuzziness cannot be completely eradicated, and the problems remain as to who shall do the partitioning (the code makers or its interpreters), whether the partitioning rules are consistent with one another, and ultimately of course whether the rules render decisions that can be ordered better or worse in terms of the aims and objectives of the social group.

It is clear that these ethical problems are interrelated, but the primary emphasis of this essay is not one of establishing satisfactory rules for deciding individual cases. Instead attention is directed to the forces that may be at work to establish the code of values and provide for change. In the essay on psychological reactions, the goals and objectives were more or less taken as given so that the intermediate threads of behavior could be the center of the focus. Here the concern is with the considerations that help to set goals and objectives. Concern at this point therefore is more with the sociological forces that shape and form the objectives and determine the socially acceptable means for attaining them and less with finding whether a particular action or a particular person fits into the currently accepted pattern. It is the thesis of this discussion that these ends and processes are socially determined, that they are now in a period of a rapid change, and that the perceptors for the accounting profession are not so sensitive as they could be.

---

[1] It goes without saying that the goals and objectives change and flexibility must be built into the organization. One can "try" a Kwakiutl case by referring to a Samoan code, but the effects are not likely to be satisfactory. Rudolph Carnap emphasizes two-common uses of the term ethics. "Sometimes a certain empirical investigation is called ethics, viz: psychological and sociological investigations about the actions of human beings... Ethics in this sense is an empirical scientific investigation; it belongs to empirical science rather than philosophy. Fundamentally different from this is ethics...as the philosophy of moral values or moral norms, which one can designate normative ethics. This is not an investigation of facts, but a pretended investigation of what is good and what is evil, what is right to do and what is wrong to do." Quoted from Morton White, The Age of Analysis (New York: Mentor Books, 1955), pp 216-217.

The earliest type of accounting apparently arose with the rise of accountability in connection with storage and what are now known as bailor-bailee arrangements. The objectives of accounting were then fairly direct, and the process consisted of the preservation of a record or inventory of the goods to be accounted for, a storage device for preserving the record and a process for comparing the goods returned to the bailor with the record, which at this point serves as a standard to which the returned goods should conform. A type of advance -- or perhaps a sidestep -- came about when the accounting process was expanded to include, as historical data to be preserved, the location of the goods left by the bailor. Thus the records also became *guides to internal action.*

Up to this point there has been no responsibility that requires valuation, or a substitute for valuation in the form of costs, or for that matter there has been no need for a common denominator. The need for a primitive kind of common denominator arises when the arrangement takes the form of returning the goods in kind and does not imply that exactly the identical goods are to be returned. The historical records then must contain a different kind of description. It is true that the description of the original goods could be used in order to obtain the proper "kind" but there can be little doubt that a type of abstraction from specific items to "identical kinds" of items was a tremendous step in abstraction and in descriptive record-keeping. The accountants of the day must have been faced with a problem of some magnitude -- they could abandon for lack of need the exact description of items and substitute a general class description. In order to preserve useful class descriptions in the records, it was necessary that elementary measurement be brought to the aid of the accountant. Up to this point description was necessary and the ability to specify number, but no measurement even in the ordinal sense was required.[2]

Additional responsibilities were placed on the profession when the concept of return in physical kind was replaced by the concept of a common denominator of value. To meet such needs new rules had to be devised and incorporated into the conventions of the profession, and these rules are being debated at a lively rate even today. Some present-day accountants seem to assume automatically that "accountability" means accountability in terms of original costs, or at least in terms of the number of monetary units committed. Thus, by invoking the word 'accountability' they somehow invoke a defense for original cost and a weapon to be used against current costs and specific adjustments for price-level changes. The attitude which uses cost or value at the time of commitment for the recording base rests on a number of assumptions. Who is to benefit by any increase or stand to lose through the decrease? And should the

---

[2] It is true that some authors have treated counting as measurement and have defined what are sometimes known as "enumeration variables." Counting clearly requires an ordering of classes (cardinal numbers), requires identifying of units, and matching the units that have been discriminated with the names of classes, but it does not require an ordering of the data. The concept of "distance" in measurement is implied and is treated as equal in the discriminatory effort of identifying the unit.

measuring rod be assumed to be constant or permitted to have some deviation so long as the immediate parties have no appreciable control over the changes?

Notice that the stages are all related to objectives or things that are considered to have value to worthy parties -- all is *value* oriented. Suppose for an illustration that a society is interested primarily in the quality that is subjectively interpreted as "blueness." The obvious scale for measuring the progress toward the social objectives is then in terms of this quality. In extreme cases one may abstract from all other characteristics and attributes. The advantage of generalized value to weight diverse objectives now becomes obvious. The accountant can use a common denominator of value, abstract from all kinds of physical properties, and concentrate on matters of concern to the individuals involved.

With the growth of large-scale activity the interests of different groups and different individuals become widely varied. The interests ~~were~~ are sometimes identical, sometimes adverse and sometimes mixed, and they often vary widely through time and from one social environment to another. Somehow in the social organization provision must be made for evaluating these interests and deciding a hierarchy of worthiness. Mechanisms for making evaluations must be set up, and among the mechanisms or processes must be one for recording progress and status in terms of the factors that are considered to be sufficiently valuable to merit attention and to justify record keeping. Such an information system includes among it processes the devices that have for centuries been known as accounting. One of the problems that arises is whether such an information service is to react passively to change or whether it is to take an active part in shaping the ethical structure itself. This problem too is settled in the general milieu of changing social patterns and shifting ethical systems, and an information system can certainly play both passive and positive roles.

The importance of values in a social organization is so great that such organizations are sometimes identified by their "value-systems." The methods of scientific investigation the objects studied by scientific methods, the people who carry on the activity and even the procedures of so-called causal analysis may be said to be greatly modified if not determined by the value system and orientation of the social group. Weber, a leading advocate of the "sociology of knowledge," is most emphatic.

> The *significance* of a configuration of cultural phenomena and the basis of this significance cannot however be derived and rendered intelligible by a system of analytical laws...however perfect it may be, since the significance of cultural events presupposes a *value-orientation* toward these events. The concept of culture is a *value-concept*....Only a small portion of existing concrete reality is colored by our value-conditioned interest and it alone is significant to us.[3]

---

[3] Max Weber, *On the Methodology of the Social Sciences*, trans.

The view that is usually identified as the sociology of knowledge may have been overstated in some instances and the possibilities of escaping the constraints may have been presented far too simply, but it is impossible to escape the general thesis. The cultural institutions determine what knowledge is to be recorded, preserved and passed on to following generations, and which area of knowledge is to be expanded. By conferring prestige and financial rewards or by ridiculing egg-heads, brain-trusters, and intellectuals as childish incompetents some societies regulate the effort devoted to transmission and expansion of knowledge. Weber adds:

> ...the choice of the object of investigation and the extent or depth to which this investigation attempts to penetrate into the infinite causal web, are determined by the evaluative ideas which dominate the investigator and his age....For scientific truth is precisely what in *valid* for *all* who *seek* the truth.[4]

While we accountants need not pass on the priority or relative importance of sociology and individual psychology, we must be aware of the interaction of the two and be on the lookout for useful approaches that can utilize both aspects of the work.[5]

Edward A. Shils and Henry A. Finch (Glencoe: The Free Press, 1949), reprinted in *Readings in Philosophy of Science*, ed. Philip P. Wiener (New York: Charles Scribner's Sons, 1953) p. 329. Notice also: "...an exhaustive causal investigation of any concrete phenomena in its full reality is not only practically impossible it is simply nonsense." (p. 330.)

[4] *Ibid.*, p. 334.

[5] Weber, of course, assigns methodological priority to sociology. "...the procedure does not begin with the analysis of psychological qualities, moving then to the analysis of social institutions, but...on the contrary, insight into the psychological preconditions and consequences of institutions presupposes a precise knowledge of the latter and the scientific analysis of their structure....We will not...deduce the institutions from psychological laws or explain them by elementary psychological phenomena." *Ibid.*, p. 338. Edward Chace Tolman emphasized a similar view. "...the psychologist's independent variables are not in any final sense independent and absolute. They are always immersed in a 'field' constituted by the 'cultural pattern' of the whole group. They cannot be manipulated independently of this field." "It was the Gestalt psychologist who first brought it home... that the whole can often be said to govern its parts quite as truly as the parts may be said to govern the whole." "Physiology, Psychology and Sociology," *Psychological Review*, May, 1938. Reprinted *ibid.*, pp. 228, 227. Kurt Lewin, as might be expected, holds a similar view. "...the so-called 'subjective' psychological world of the individual, his life-space, is influenced in a much earlier stage by social facts and social relations than anyone would have expected a few decades ago....Beginning with this early age, the child's behavior is molded in every respect by his social situation. Of course, his morale, his religion, and his political values are determined by his being a part of, and reacting to, the society in which he lives...social influences enter every action of the individual, even actions which seem to have

That serious consideration must be given to the problem should also be self-evident. The general importance of the view is admitted even by critics. For example, Popper states:

> The sociology of knowledge argues that scientific thought, and especially thought on social and political matters, does not proceed in a vacuum, but in a socially conditoned atmosphere....The social habitat of the thinker determines a whole system of opinions and theories which appear to him as unquestionably true or self-evident....for there is no doubt that we are all suffering under our own system of prejudices (or 'total ideologies,' if this term is preferred); that we all take many things as self-evident, that we accept them uncritically and even with the naive and cocksure belief that criticism is quite unnecessary; and scientists are no exception to this rule...."[6]

That the training of accountants has been conditioned by the tremendous conditioning power of the social institutions including the rigidity of the methods themselves is beyond question. The British stewardship principle with its emphasis on charge and discharge of responsibility may be associated naturally with the semi-feudal social arrangements of the time with their emphasis on rights and correlative responsibilities. The venture accounting of the Italian city states and much later in connection with mining ventures in the Western World is appropriate for the purposes and institutions involved. Of more recent date, one finds emphasis on the viewpoint of shortterm creditors reflected in the study and accentuation of the financial report. The change of organization type with the rise of important investors and managers brought about a slow and ponderous swing of emphasis in accounting to the income report and to managerial accounting. Perhaps the most striking, and least justified, example of the influence of the environmental framework on accounting is reflected by the still prevalent feeling that double-entry bookkeeping is somehow connected in some fundamental way with the institution of private property. The identification of the recording process with the dominant social institution during the period of development and growth may have limited some otherwise astute accountants in their appli-

---

do with society." "Field Theory and Experiment in Social Psychology: Concepts and Methods," op. cit., p. 220.

[6] Karl R. Popper, The Open Society and Its Enemies (Princeton: Princeton University Press, 1950), Chapter 23. Reprinted in Readings in Philosophy of Science, ed. Philip P. Wiener, op. cit., pp. 358, 361. Karl Mannheim, a leader in the movement, states mildly: "The principal thesis of the sociology of knowledge is that these are modes of thought which cannot be adequately understood as long as their social origins are obscured." In a more extreme tone he adds: "Strictly speaking it is incorrect to say that the single individual thinks. Rather it is more correct to insist that he participates in thinking further what other men have thought before him. He finds himself in an inherited situation with patterns of thought which are appropriate to this situation...." Ideology and Utopia: An Introduction to the Sociology of Knowledge. Reprinted as "The Sociology of Knowledge," Readings in Philosophy of Science, ed. Philip Wiener, op. cit., pp. 349, 350.

cation of double-entry record keeping to all kinds of alternative instituions, e.g. sectors of socialist economies, cooperative organizations.

An interesting sidelight for accountants may be gained by trying to place the important doctrine of objectivity with respect to the more general aspects of the sociology of knowledge. This problem is also mixed up with the problem of how an individual or group can break through the social environment and free himself from the total value system. We must agree with Popper that "...the main trouble about prejudices is that there is no such direct way to get rid of them....Is it not a common experience that those who are most concerned of having got rid of their prejudices are most prejudiced?" Popper continues to emphasize the social character of science and scientific method with attention to the fact that theories are set up so that they can be tested and confirmed by others. Thus social institutions govern the methods of science and scientific investigation, and it should be abundantly clear that the methods of today are entirely different from those employed by the Greeks and the Schoolmen. In some cases investigations are carried on and reported by cranks and by those subject to hallucinations or extreme bias, but the social institutions that surround science (and are in turn strongly influenced by scientific method and its success) provide for verification and reporting techniques that tend to screen the trustworthiness and applicability of all reports. Not the least of the advantages of such institutions and attitudes is the fact that results are not given credence and investigations themselves are discouraged unless their verification by others with equal training and apparatus is possible. Such attitudes are socially determined, for in certain more primitive cultures, a variety of reports that have no possible means of verification are encouraged. At least one religious group in the Western World interprets certain experiences in a mystical manner that is vastly different from usual scientific interpretations. In a similar manner mystical interpretations used by some Eastern religions, and indeed by the Judeo-Christian tradition, call for considerable ideological grounding before they become apparent.

Thus, Popper concludes: "...what we call 'scientific objectivity' is not a product of the individual scientist's impartiality, but a product of the social or public character of scientific method..."[8] Popper apparently accepts Russell's scientific men who are the equivalent of "economic men" and who are rational in the sense of conforming to the social institutions of science and standards for rationality.[9] The alternative to looking at science and objectivity as "the correlation of

---

[7] Ibid., pp. 365-366.

[8] Ibid., p. 363. Popper emphasizes this point often. "...ironically enough, objectivity is closely bound up with the social aspect of scientific method, with the fact that science and scientific objectivity do not (and cannot) result from the attempts of an individual scientist to be 'objective,' but from the cooperation of many scientists. Scientific objectivity can be described as the intersubjectivity of scientific method." (p. 361)

9. The difficulties of even defining rationality are

experiences common to all normal people" leads to a semi-solipsistic position in which verification is conceived as a repetitive pattern in the results as they appear to the individual.

It is not enough to realize that man is a product of his times in all facets of intellectual and professional behavior, even as to the form of logic he uses, and to muse with Marcus Aurelius that we are a part of all that we have met.[10] How can one recognize the work and the dynamics of the institutions with the hope of anticipating them and of having a positive influence (control) over them? To escape them seems to be impossible. In various communist countries the party elite is supposed to be able to free itself of the capitalistic environment (ideology) and to recognize the institutions that tend to make "pigs of men." Psychiatry may offer some techniques and methods, and Popper points out that the sociologists of knowledge (among whom he cannot be counted) hope to develop a sociotheraphy.

> Similarly, the sociologists of knowledge hold that the 'freely poised intelligence' of an intelligentsia which is only loosely anchored in social traditions may be able to avoid the pitfalls of the total ideologies; that it may even be able to see through, and to unveil, the various total ideologies and the hidden motives and other determinants which inspire them. Thus the sociology of knowledge believes that the highest degree of objectivity can be reached by the freely poised intelligence analyzing the various

---

tremendous. Harold Garfinkel has devoted considerable attention to this problem and has isolated at least eight commonly-used variations of the concept. 1. Categorizing and Comparing, 2. Tolerable Error, 3. Search for Means, 4. Analysis of Alternatives and Consequences, 5. Strategy, 6. Concern for Timing, 7. Predictibility, 8. Rules of Procedure. This discussion is well worth the effort if for no other reason than to illustrate the difficulties in forming constructs. "The Rational Properties of Scientific and Common Sense Activities," Behavioral Science, January, 1960, pp. 72 - 83. Bertrand Russell's reference to trained scientific observers who are somewhat like the "economic man" of political economy is found in Human Knowledge, Its Scope and Limits (New York: Simon & Schuster, 1948), p. 208.

[10] The development of historicism under such mystics as Benedetto Croce and Jose Ortega y Gasset is directly related to this view. Ortega is more quotable, and the results are heady stuff for accountants who are concerned with the past. "Man is what has happened to him, what he has done....he carries on his back as the vagabond his bundle of all he possesses. Man is a substantial emigrant on a pilgrimage of being.... Man, in a word, has no nature: what he has is...history....The past is not yonder....The past is I...." Toward a Philosophy of History (New York: W. W. Norton & Co., Inc., 1941). Quoted from The Philosophy of History in Our Time, ed. Hans Meyerhoff (New York: Doubleday Anchor, 1959), pp. 61, 64.

hidden ideologies and their anchorage in the unconscious. The way to true knowledge appears to be the unveiling of unconscious assumptions, a kind of psychotheraphy, as it were, or if I may say so, a *sociotheraphy.*[11]

It seems appropriate to reflect on the needs of society in connection with an information-control system and on the perceptors that a profession employs to receive impressions. The mechanics of this sort of thing are discussed elsewhere, so that the present discussion is devoted to the relationship of the accounting profession to individuals in the society who seem to have a claim for information and merit consideration. This appraisal is a problem in arraying objectives and worthiness and forming hierarchies of merit. Clearly the accountant's rating scale is formed by his own environment, and the individual values he assigns are a part of and must be consistent with the overall value system in which he operates.[12]

At one stage in our social development (even at present in some isolated areas) the ethical structure appeared to be comparatively simple. Some supernatural being was explained on the basis of written or other evidence, and the evidence usually included a ranking of the major social values. Such codes share the difficulties of all classificatory schemes, and produce a priesthood whose duty it is to "judge" in the sense of providing procedures and rules for items not covered in the code. The

---

[11] Karl R. Popper, *op. cit.*, p. 359. Notice the difference in viewpoint expressed below in the liberal tradition. "...*liberalism takes the individual as given*, and views the social problem as one of right relations between given individuals." Frank H. Knight, *Freedom and Reform* (New York: Harper and Bros., 1947), p. 69.

[12] In some developing countries the chief purpose of accounting seems to be conceal rather than to reveal information. A contributing factor is a set of laws, sometimes combined with stupid non-price-system directives, that makes honesty in the traditional sense incompatible with economic, and perhaps even physical, survival. The public accounting profession -- to the extent that it exists as an independent information service -- adopts rules for concealing or reporting that permit their clients to survive. At the same time many members hope for a return of traditional ethical values and look at the present current unsatisfactory position as temporary. American accountants differ only in degree. Padded expense accounts, reimbursed personal expenditures, minor thievery of office and other supplies, payoffs buried in selling expense, and a host of similar items are essentially antagonistic to America's professed ethical standards. Yet these items and many more usually filter through the accounting system undisclosed or unreported. Universities are among the worst offenders and often make transfers from fund to fund with less disclosure than is required of the corner grocery. Juggling expenditures against appropriations is a refined art that must be mastered by aspiring young administrators. A now famous question: Professor (practitioner), let me hear again your definition of 'honesty'?

primary task in this connection is to construct rules that are not manifestly in disagreement with the superior code. The priesthood then attempts to gain status and sanction for its actions by claiming kinship in some spiritual -- or even physical -- sense with the supreme being. While this arrangement looks foolproof and tends to stability, its performance has been marred in practice by the development of new evidence and the growth of competing supreme beings. Some cultures have divided the responsibility for the ethical codes among several induced beings and then established a hierarchy among them or divided the field of ethics among them.[13]

The transition to natural rights offers interesting points for speculation. The period of feudalism was a period of considerable stability in social institutions and followed a long era of wars, barbarian invasions and the inability of the civilized portions of Western Europe to preserve order. A vast hierarchy with a network of responsibilities and authorities was formed. In many cases a supernatural being was placed at the top of the hierarchy to lend sanction to the general ethical code with the next highest level (e.g., kings) often claiming to be supernatural in some kind of inferior way. As the feudal system broke up the era of commercial enterprise, the city state, and nationalism developed. In spite of the established Church's attempt to preserve the ethical principles of self-restraint, the "just price," and the non-usurious lender, the social institutions changed so that a sharply modified system of social values emerged. The pursuit of self-interest was sanctified and the accumulation of material wealth was considered to be evidence of divine favor. The social order then became "success oriented" toward materials things. Self-interest became acceptable and even admirable, for by striving for selfish ends the ends of others -- indeed of all society and its supernatural leader - were automatically furthered. The justification for this doctrine was apparently based on a number of relationships including the need for a free market of sellers and buyers, an enlightened electorate and judicious court officials. The advocacy principle assumed that the harshness of extreme self-interest in the market place would be alleviated by knowledge and competition. In the political arena each candidate could put his best foot forward and denounce his rival, for by so doing the necessary facts would be brought forth through self interest, and the voter was assumed to be able to sift the misinformation from the facts and reach acceptable decisions. In a similar fashion cases at law were presented on the advocacy principle

---

[13] The development of the movement toward one God is usually counted to be an improvement by those with Judeo-Christian orientation, but not all ethical theorists support this contention. The subsuming of all the rules (pleasant and unpleasant) with all the sanctions under one being makes for a multi-schizophrenic personality. The trinity appears to have incorporated some vestiges of polytheistic religions without the advantage of separation of power and duty. Breasted has emphasized the historical correlation of monotheistic religions and authoritarian political institutions. Hegel's worldview (absolute idea) has goals and intentions of its own and needs only a face.

with the thought that by so doing the facts and issues would be presented through the impetus of selfinterest, and the judge would be able to allow for any resulting "over emphasis" and over-enthusiasm. With the assumption of active competition, an informed electorate, and an enlightened judicial system, the need for individual responsibility for the interests of others seemed to decrease. Consequently the emphasis in the minor field of accounting changed from the charge-discharge form of responsibility statement with its obvious fiducial overtones to the accounting for gain or loss to the residual group, whose pool of interests could be represented as proprietary equity. Even the fundamental equation, which emphasized responsibilities accepted and responsibilities discharged, changed to assets equals claims to assets or some variation that emphasized ownership. The twentieth-century variation of assets equals equities has essentially the same implications with acknowledgement that creditors have some interest that deserves attention. The relative shift of emphasis from the balance sheet, which could be interpreted as a sort of responsibility statement, to the income sheet is essentially in keeping with the success-oriented times that emphasized self-interest and changing evidence of supernatural approval. It is only within the last decade or two, that the emphasis on fund accounting, assets equals responsibilities, and outputs equals inputs plus residues has reflected a return to the cooperative ideal of society with more emphasis on responsibilities to others and less on properties and worth.

The resulting problem for the accounting profession according to some accountants, is to interpret the new value orientation and to find rules that will help replace faith in the market place, the infallibility of judges, and the brilliance of the electorate. This problem was discussed brilliantly by DR Scott a third of a century ago, but his impact was only minor.[14] Scott, an economist and a former disciple of Veblen, was concerned with the obvious failure of market economics with its fantastically simplified behavioral assumptions to mediate the rights and needs of groups and individuals in society. This position in Benninger's words is stated:

> In the coming society, the controlling force over economic affairs would be a subtle but coercive one. Such a force, Scott felt, would be the institution of accounting itself, adjusted to an

---

[14] DR Scott, The Cultural Significance of Accounts (New York: H. Holt and Company, 1931). A more condensed treatment of accounting principles may be found in "The Basis for Accounting Principles," The Accounting Review, XVI, No. 4 (December, 1941), pp. 341 - 349. Applications to cost accounting may be found in "Accounting Principles and Cost Accounting," The Journal of Accountancy, February, 1939, pp. 70-76. Some philosophical backgrounds including Scott's emphasis on science and relativism are available in "Economic in an Age Science and Machines," Journal of Social Philosophy, July 1937, pp. 317 - 326. An outstanding explanation of Scott's system by a former student is contained in L. J. Benninger's "Accounting Related to Social Institutions -- the Theoretical Formulations of Scott," Accounting Research, January, 1958, pp. 17 - 30.

> underlying philosophy based on science....The long-term trend spelled an increase in control over economic life by government. Such control would be effected by the increasing use of commissions of experts....Eventually, Scott seemed to imply, conflicts among different types of commission control would arise and would need to be resolved by some central economic commission charged with planning the major objectives of the social and economic system.... The scientific viewpoint would be applied to economic problems in large, partly through dependence upon an institution which had successfully adapted itself to change over the centuries -- accounting....Scott felt those in controllership would be the first to achieve professionalisation....Accounting would become a dynamic, controlling force wholly in tune with men's larger concept of a philosophy of science....As social principles evolve, it becomes essential that the entire hierarchy of accounting rules and principles also change.[15]

Scott's concern with substitutes for the marketplace because of the growth of largescale enterprises is echoed by those who are trying to devise intra-firm transfer pricing techniques to supplement or to replace the traditional pricing mechanism as a guide to resource allocation, alternative uses, and control of efficiency within the firm. His predictions for the growth of professional accounting principles as a substitute for the price system seems based more on a system-wide breakdown of the pricing structure.

It should be pointed out that the price system as a device for "establishing and preserving equity" among groups has never satisfied all social philosophers. There is no reason to assume that there is especial virtue in the distribution of shares as the result of paying each factor the value of its marginal product. Nor is there any automatic reason why the payments of economic rents to suppliers or the enjoyment of consumers surpluses (if any) tend to give the best distribution unless 'best' is defined precisely in this fashion. Nevertheless the feasibility and elegancy of such a system when compared with such non-operational formulas as Blanc's rule to produce according to ability and consume according to need is so obvious as to require no comment. As a disciple of Veblen, Scott was not sanguine enough to assume that the price system is without fault. He did maintain that in one stage of economic development with its concurrent value system, the price system could be relied on to render an acceptable settlement to many of the obvious conflicts of interest in a complex society.

It is interesting to observe that the modern organization man of big business -- the manager -- has outstripped the professional accountant in moving into the vacuum left by any decline of the price system. Many professional managers now take the view that their primary obligation is to the "organization," and that one of their primary duties is to mediate between the conflicting interests of consumers, laborers, owners, creditors and others. In fact, many are equally sure that the division of spoils between present owners in the form of current dividends and all groups

---

[15] L. J. Benninger, op. cit., pp. 20, 21, 22, 23.

present and future who stand to gain by a policy of retaining earnings and -- the magic word -- "growth" is a responsibility of management. Apparently management uses perceptors to sense and to appraise the need and strength of desire of each contending group, and after providing for its own needs and, if possible, for survival of the organization, makes the distribution that seems to be "equitable" and "proper." The growth of this feeling and the growth of the importance of the modern managerial class has led -- belatedly -- to some thoughts about the necessity for training and the kind of training that may be needed. Until recently there has been far too little in the university training of management graduates that would seem to help reach these important decisions. In fact, major courses have so far been devoid of any real substance in this direction, and almost devoid of workable rules to replace the automatic working of the price system -- good or bad. Perhaps the ethical training is left for courses in electives or humanities. In any event some studies have revealed that the student of business is especially motivated by the desire for material things. This tendency might be expected as a result of the selection process, but some current researchers have been surprised by the tremendous number of students in business schools who are not the least concerned with the means by which wealth is acquired.

The accounting profession has a long tradition for reasonably impartial reporting of general-purpose information, although many in the profession feel that accounting has lost ground rather than gained. The Securities Act and the Securities and Exchange Act are tangible evidence that the public became disgusted with the reporting performance of businessmen and that the accounting profession was not strong enough to insist on adequate reports. To some extent the Securities and Exchange Commission has kept the initiative for good reporting and with competent leaders has helped the accounting profession meet some obligations that with more aggressive internal leadership would have been met decades before. Many state corporate codes prescribe methods of accounting, but this situation alone should not lead to the conclusion that the profession has been deficient. In many cases the initiative for change came from the accounting profession, and the provisions of the code were expressions that tended to solidify advances already made in the profession.

There has been an unfortunate feeling among many accountants that the profession, and accountants as accountants, have no excuse to formulate rules that may, for example, interfere with managerial freedom or the interests of stockholders.[16] It should be obvious that accountants must

---

[16] Perry Mason states: "Is there any *accounting* reason why adjustments....can not be made in any way desired by the stockholders as long as legal requirements are met and full disclosure is made of the facts?....Why is this an *accounting* matter? "The 1948 Statement of Concepts and Standards," *The Accounting Review*, April, 1950, pp. 137, 138. V. E. Odmark speaks convincingly for the opposing view. "Every decisions made by the accountant is a valuation decision fraught with possibilities of justice or injustice to some economic interest." "Some Aspects of the Evolution of Accounting Functions," *The Accounting Review* October, 1954, p. 638.

accept such obligations and insist on an area of decision making or they must abdicate the judgmental aspects of their work almost entirely. It is necessary to use "almost entirely" because it is possible to hold an intermediate position and maintain that the accountant's recommendations should always be advisory to law enacting bodies and that accountants should require only that his client conform to established regulatory rules.

The controversy then is between the view that accountants should make a series of rules and conventions and insist on compliance directly and the view that they should operate through organized legal and regulatory channels. Whichever procedure seems to be more feasible, it seems that the accounting profession has the responsibility for putting checks and controls on those who render stewardship reports. Even where it is contended that accountants should require only what the laws and commissions require, it is also generally admitted that the profession should act as eyes and ears -- perceptors -- for those who make the laws. It seems that this would be the least that society could expect from an independent profession that devotes itself to measuring and reporting. Strangely enough there is a large and important segment of the profession that holds otherwise.

Scott thought that controllers would be the first to professionalize, and this attitude is understandable in one who is a cost accountant. The second quarter of the century showed a tremendous increase in the attention given to controllership in business gatherings and universities and to the related procedures of internal auditing. Considerable attention was devoted to the functions of controllers as coordinators in spite of the fact that managers have long been regarded as coordinators par excellence. The controller, it was argued, has an overall organization view and thus has the advantage of both the broad view and the detailed information necessary to appraise and coordinate the specific and diverse interests.

As conceived in the early years controllership was to be professionalized and be concerned with all present and future interests involved in the organization. Management was assumed to be interested primarily in the welfare of the owners narrowly interpreted. However, some managers began to realize that their functions covered the interests of all those related to the organization, including suppliers, customers, workers, and even political subdivisions and the residents of the community affected. Some teachers of business, political science, economics and sociology began to feel that the market mechanism had certain shortcomings and that a coordinating group with some degree of integrity and professionalization must be trained. This professional group determines the size of the revenue stream and its distribution among contending parties. This type of manager considers his position to be similar to that of managers of governmental units -- a coordinating judiciary that decides how much the taxes shall be, who shall pay them, and which of the hungry contenders shall receive them. The combination of a business and public administration school thus seems understandable unless one holds the resurrected position that the function of managers is to maximize the present value of the residual stockholders' interest.

We may ask what, during this interval, controllers and accounting departments have been doing to help establish the responsibilities of the profession. It is the opinion of many that the accounting profession was not doing enough. In fact they may have been going in the wrong direction. Public accountants were so concerned with "objectivity" and "consistency" and the desire for uniformity in that they seemed to exchange a reduction in responsibility for an increase in professionalization.[17] On the other hand, the tremendous popularity of the phrase managerial accounting and the deflection tothis view of some extremely able professors tended to slow down professionalism.

Emphasis on managerial accounting may be partly justified as an antidote for the obvious overemphasis on public accounting by many departments of accounting. The growth coincides roughly with the tremendous increase in knowledge about the place of incremental analysis in decision making and with the tendency for management itself to become a profession. Unfortunately the practical effect of the change in emphasis has not tended toward the professionalization of managerial accountants or their adoption of a desirable code of responsibilities. It is the belief of many that the emphasis on management's needs has tended to make spineless "errand boys" of internal accountants. The very title "managerial accounting" somehow indicates limited scope of responsibility.[18] It is probably fair to say that managerial accounting as it is now taught in universities is concerned primarily with how the accountant should

---

[17] It is not meant to imply that they have abdicated responsibility, although to an impartial observer it seems that the profession has decreased its area of judgments and responsibility in order to hold to methods that can be applied with some degree of uniformity. For example, we are not valuers. We are not experts in materials. (But we give opinions on management's representations on materials.) We are treating depreciation as a cost assignment, with spreading "in a systematic" manner being more important than value, benefit, or restatement for changes in the measuring stick. We take no special responsibility for finding misallocation of organizational assets for nonorganizational ends--fraud and embezzlement. We permit the most fantastic treatments of development and research costs, and the reports rendered by some development firms are as close as a profession can come to sheer nonsense.

[18] It is possible to argue with Billy Goetz that managerial action should be equated to all decision-making, so that anyone who makes decisions is by definition a manager. This view has the advantage of not requiring a line between internal and external decision makers, but we should remember that learning is a process of carving out manageable portions of experience. DR Scott concludes: "...we might well moralize by pointing out that whenever management prostitutes accounts by making them serve its particular ends, it loses the objective, disinterested service which is the greatest contribution of accounting to management." "The Basis for Accounting Principles," The Accounting Review, December, 1941, p. 347.

gather information, sift it and present it to further efficien~~t~~s internal managerial decisions. This concentration has reached such a stage of specialization that accounting courses in some modern schools of industrial management fail completely to consider the ethical responsibilities of the profession. Unfortunately they also tend to duplicate the material taught in related courses in industrial engineering, operations research, industrial economics, business economics, and management.

Now it is entirely possible that the mastery of procedures and techniques in accounting requires much more student time than is necessary for understanding the rights of contending groups in society, but it is the contention of this writer that it is precisely the latter that merits university study and subsidy by political subdivisions and foundations. The mastery of methods and techniques is training that can be learned on the job under direct supervision and should not be allowed to compete for scarce resources that are the only support for study of abstract fields such as ethics.

The ordering of the worthiness of groups for attention and information requires perceptors. The most common type of perceptor in our economic system is connected with the cash register and with expected income. It is important to emphasize this aspect of the problem, for in a profit-seeking social environment such perceptors are highly developed, and the social pressures are not directed against success-oriented self-interest. In fact, social pressure tends to emphasize the desirability of such perceptors and to gauge success in terms of the income take. If accounting were to be governed entirely by the price system, its progress, its scope, and its content would be determined primarily by whether someone is willing to pay for the service. Leaders in the profession would be essentially good businessmen who can ferret out new needs and decide what information should sell best and to whom. Accounting leaders, like their entrepreneural counterparts, would be on the outlook for new possibilities for a profit and would try to divert some of society's resources (in the form of capable juniors) to these needs. A process of selection of new leaders would tend to reward those who have highly developed perception by making them wealthy and by punishing those who appraise the situation wrongly by less wealth or even losses.

Many folks have felt that the price system does not operate effectively in certain segments of society. Such a procedure may develop a canny, efficient, competent businessman, but self-seeking businessmen hardly constitute a profession. In fact the very idea of professionalism is a counterbalance to what's-in-it-for-me attitude and instead emphasizes responsibilities to wider groups.

It is important to point out that ethical statements are not subject, like ordinary propositions, to the true-false machinery of formal logic. Most ethical statements are what is known as pseudo-statements, for they do not contain the usual subject-predicate construction. "The statement 'sin is bad' is not a proposition in the usual sense, for it is quite possible for A to believe the statement to be true and for B to

believe equally strongly that it is false. A would be asserting the equivalent to 'I believe that sin is bad.' B, on the other hand, would be asserting the equivalent to 'I believe sin to be not bad." Both of these statements in this form may be true or both may be false. Similar difficulties arise in the field of esthethics. 'Mary is beautiful' is equivalent to the statement: 'I believe Mary to be beautiful.'"[19]

An interesting feature of statements of this type is that disputation can go on at great length without reaching a conclusion. Such controversies are not nonsense, for it is legitimate for A to try to convince B of the rightness of A's view and the wrongness of the other. If by some outside chance, B is in fact convinced and changes his previous view, it does not follow that his previous statement is false and that A's previous ~~statements~~ statement is correct. One asks then how can one argue or even talk intelligently on ethical matters. Now do we go about convincing someone else that our ethical or esthetical judgments should prevail? If done correctly this type of argument reduces to empirical operations. We must give operational meaning to "bad" in the sense of getting agreement on what actions probably follow from "sin" and further agreement that these probable results meet the definition of "bad". This type of argument requires induction as to probable results and agreement as to definitions involved.

In a period of technological change, when it is popular to talk about the probable effects and benefits of automation, it is interesting to consider Scott's thesis that:

> The burden of this course runs to the effect that it is the fundamental function of accounts and statistics to so analyze and present the facts that the decisions of the management will be automatic. Instead of presenting accounts and statistics as tools through which management controls operations under its authority, this course presents them as means through which the management is itself controlled by the facts.[20]

At first glance this statement seems to be that of an institutionalist economist beyond the ken, but it must be observed that some computer addicts of recent years are pursuing the same ideal. The Scott formulation is highly objectionable, for it appears that the facts are the important consideration. It is now recognized that the benefits of this sort of automatic decision making reside chiefly in the organization of the facts. Automatic management---if such a thing is not a contradiction of terms---will come when the decision system is so refined that comparisons are simple enough to be handled by mechanical means, the rules are simple enough to be followed by mechanical means, and the steps, for comparison are specified so carefully that mechanical means can follow them. The required facts are then automatically specified and gathering them is a relatively minor detail. In Scott's formulation, management is "premanagement" in that the rules for decision are specified and the required

---

[19] Alfred J. Ayer, Language, Truth and Logic (New York: Dover Publications, Inc., 1946), pp. 110 ff., passim.

[20] DR Scott, "Unity in Accounting Theory," The Accounting Review, June, 1931, p. 107.

facts are preordered and gathered according to the required scheme. There is no doubt that with properly specified rules and appropriate facts, machines, or subordinates, or many other kinds of devices could accomplish the automatic part of the problem. Managers inevitably reappear to specify the decision rules, to fit them to feasible gathering devices, and to set the rules for weighing sacrifice and determining allowable costs.

THE ACCOUNTING TEACHER AND THE SEMANTIC PROBLEM

Accounting is concerned with communication and is usually considered to be a specialized extension of the symbols that make up language. Accountants and especially teachers of accounting are acutely aware of the difficulties that arise in the process of communicating information (instruction) and have given reams of attention to these reporting difficulties. Yet in spite of this awareness accounting reports, textbooks, lectures and directives are often guilty of the most obvious kinds of errors. It is the purpose of this essay to discuss on an extremely elementary level some aspects of the trouble. The present discussion, in short, is concerned with some of the most simple concepts of the comparatively new field of semantics. Particularly it is concerned with some of the more obvious cliches, stereotypes, meaningless phrases, wrong-meaning labels, unspecified antecedents, vague referents, confusion of abstraction levels, and general tyranny of words. The accounting profession is overrun with examples of these blocks to effective communication, and teachers of accounting, if anything, have compounded the difficulties. It is cold comfort that other professions and teachers may be just as bad or worse.

In general terms semantics may be defined as the relationship of signs to their correspondents in the empirical world of sensory data. It is difficult to overestimate the importance of this branch of learning. "Indeed, it does not seem fantastic to believe that the concept of sign may prove as fundamental to the sciences of man as the concept of atom has been for the physical sciences or the concept of cell for the biological sciences."[1] Morris has been a leader in the movement for the unity of science and is known for his classification system under which he includes the entire study of science as the study of the language of science. The general study or science of signs is known as semiotic.

---

[1] C. W. Morris, "Foundations of the Theory of Signs," International Encyclopedia of Unified Science (Chicago: University of Chicago Press, 1955), p. 120. "....it is possible to include without remainder the study of science under the study of the language of science, since the study of that language involves not merely the study of its normal structure but its relation to objects designated and to the persons who use it." Ibid., p. 180. An acknowledged leader in the syntactical and semantical area of semiotic is Rudolf Carnap. See for example, Introduction to Symbolic Logic and Its Application (New York: Dover Publications, Inc., 1958), Introduction to Semantics (Cambridge: Harvard University Press, 1942), Formalization of Logic (Cambridge: Harvard University Press, 1943), Meaning and Necessity (Chicago: University of Chicago Press, 1947), The Logical Syntax of Language (New York: Harcourt, Brace and Company, 1937).

In turn semiotic is divided into:

1. Syntactics--the investigation of the relation of signs to signs.
2. Semantics--the investigation of the relation of signs to objects.
3. Pragmatics--the investigation of the relation of signs to people who use signs.

According to this classification syntactics includes the fields of logic, syntax and mathematics, for it is concerned with conventional rules for manipulating signs and abstracts completely from the relation of signs to objects or to users of signs. It is this branch of semiotics that deals with general axiomatic method, abstract geometry, set theory, and pure mathematics generally. Thus syntactics is made up of sentences (propositions) without material or empirical content, and a study of syntactics deals with rules for combining, transforming and forming signs.

Pragmatics is concerned with how behaving organisms react to signs. Stevens (following Morris) points out that "the interpreter of a sign-vehicle is an organism whose 'taking-account' of the sign consists in a habit to respond to the vehicle as it would to the thing designated by the sign. Thus we find the problem of pragmatics cast in such a form that it can be handled by behavioristics - we deliberately avoid talking about the subjective effects of signs unless these effects are disclosed by public operations."[2] There are several facets to pragmatics. A subdivision known as descriptive pragmatics is concerned with the study of pragmatics as a device for the study of the person. Psychiatrists, for example, study in detail the signs that influence patients, for in many cases the patient's set of signs no longer stand for the objects and relationships that they once did or they now do for most other persons. "...the troublesome world of reality is pushed aside and the frustrated fellow gets his satisfaction in the domain of signs, oblivious to the restrictions of syntactical and semantical rules."[3]

---

[2] S. S. Stevens, "Psychology and Science of Science," Psychological Bulletin, 36 (1939), pp. 221-263. Reprinted in Readings in Philosophy of Science, ed. Philip P. Wiener (New York: Charles Scribner's Sons, 1953, p. 179. Morris states: "Historically, rhetoric may be regarded as an early and restricted form of pragmatics....Considered from the point of view of pragmatics, a linguistic structure is a system of behavior..." Op. cit., pp. 108, 110. Also by Morris: "...the snarl of a dog is the sign, the attack is the designatun, the animal being attacked is the interpreter, and the preparatory response of the interpreter is the interpretant." Ibid., p. 114.

[3] Ibid., p. 179 in Readings. Alfred Korzybski has based his Science and Sanity (Lancaster: Science Press, 1933) on the theory that the effect of signs on users is so important that inapplicable signs that are not related to reality may drive the users insane. "Korzybski would cure

We are not concerned in this essay with neurotic behavior, but we are concerned with response habits of students, businessmen and all other users of accounting information. We want to use signs and symbols that meet reasonable and predictable standards and are subject to systematic and continuing semantical and syntactical rules. We know that human beings sometimes form habits of response to symbols and that these habits carryover to seemingly related situations where the symbols are senseless and not related by stable and predictable conventions for their use. Gibberish is widely used and is apparently attractive to many whose response patterns continue to operate and provide "meaning" to the user. Propaganda may or may not violate the rules of syntax, but it normally has confusing semantics and the confusing aspects of the semantic rules are designed purposely to create intended pragmatical effects.

The field of accounting is designed to accumulate and dispense information, and to study the field without recognizing possible semantical overtones is to neglect an important part of the field. The framework of accounting with its reaction patterns constitute a social institution and is itself a communication system. Reports of various kinds inform members of the organization about objectives and accomplishment. Messages go up or down or crosswise in the organizational hierarchy through traditional channels and in traditional symbols. In some cases the channels are noisey (contain random, distracting symbols) and the symbols are fuzzy. Messages going up the hierarchical ladder may tend to lose overtones and to pick up bias toward favorable reports, while messages going down may be surrounded by all sorts of added and perhaps irrelevant "meanings." These "pragmatic" effects result from the for-interest bias found in most reporting situations. A selective process tends to screen reports and bias them in favor of the sender. The systems accountant should be prepared to establish alternate channels with different patterns of self-interest to counteract bias and outright suppression of information. Without alternate channels suppression may be extremely easy unless the system is safeguarded by devices to assure that those who initiate and convey information have no stake in the contents of the reports. A limited amount of this kind of control results from having an "independent" accounting department in charge of communications. Internal auditors and independent auditors supplement the controllers staff for this purpose. This structure is usually combined with a limited number of alternative channels in most modern accounting systems, and there is reason to believe that the resulting reports are more reliable than some information and communication theorists have claimed.

---

the resulting insanity by renovating the patient's semantics." Stevens, Readings, op. cit., p. 622. The concern with semantics in the Judeo-Christian religious tradition is an interesting study in itself. At least two of the decalogue (three if icons are included!) are semantic in nature and an important gospel, begins and has the universe begin on a semantic note. C. K. Odgen and I. A. Richards discuss these matters and the early association of words with magic. "To classify things is to name them, and for magic the name of a thing or group of things is its soul; to know their names is to have power over their souls." The Meaning of Meaning (New York: Harcourt, Brace & Company, Inc., 1938), p. 31.

Accountants are accustomed to outright bias in the direction of self-interest, but are sometimes deceived by a subtle blend of judgment and fact known as slanting. Hayakawa states: "Slanting gives no explicit judgments, but it differs from reporting in that it deliberately makes certain judgments inescapable."[4] It should be noted that slanting may be the result of bias and be done without conscious effort on the part of the writer. Occasionally a writer without attempting to do so will use emotionally charged words that influence the reader's decision making, so that the resulting statements are slanted. Many times an author attempts to be fair by slanting both for and against to present both sides of the problem. One well known accounting writer, for example, customarily gives first the arguments for the opposing view, and then presents his own view as a rebuttal. This procedure tends to slant by the order of the arguments. The author's judgments are established by positive arguments and by demolishing those of the opposition, who of course cannot have a direct rebuttal. This type of slanting may become vicious when indefensible arguments are set for the opposition. The demolition of these arguments makes the writer's views appear to be more conclusive, especially if opposing argument are "straw men" or pseudo arguments.

Now the field of semantics is concerned with the relationship of symbols to empirical data--the so-called "rules of correspondence" or the operational instructions for defining a symbol in terms of operations on empirical data. Popular writers in the field are fond of using an analogy based on the relationship of a map to the territory it is supposed to represent. Often the symbols take on a rigidity with regard to the reaction they evoke that outlasts the uniformities in the empirical world. In this case they lose the original relationship that they once held, and the resulting reports may be as useless as road maps equally out of touch with physical conditions. The word 'capitalist', for example, is associated by many citizens over the world with pictures of ruthless greed that often appeared years ago in the leftist press. These pictures may or may not have been an accurate map a half-century ago, but it seems safe to say that the stereotype no longer represents the territory that it is now supposed to depict. Such accounting terms as 'surplus,' 'profit before taxes,' 'gross profit,' 'reserve,' 'net worth,' etc., may never have been adequate descriptions of actual territories. At present they may be downright misleading to all but the technically trained in accounting.

The task of definition is to communicate meaning to someone by using words that will bring before the listener a situation or object in the empirical world with which the listener is familiar; in fact, "...the goal of semantics might be stated as 'Find the referent.'"[5]

---

[4] S. I. Hayakawa, Language in Thought and Action (New York: Harcourt, Brace and Company, 1949), p. 48. See also, Monroe C. Beardsley, Thinking Straight (New York: Prentice-Hall, Inc., 1959), pp. 77-82.

[5] Stuart Chase, The Tyranny of Words (New York: Harcourt, Brace and Company, 1938), p. 9. It should be noted that "finding the referent"

Dictionary definition are necessarily on a high level of abstraction, and they seldom can specify necessary operations or point out an object and say: "The word cow refers to this object and this object and this object...."[6] "We normally beg the hard question of finding referents and proceed learnedly to define the term by giving another dictionary abstraction, for example, defining 'liberty' by 'freedom'....[or defining] a 'sofa'... as a 'lounge.'"[7]

---

is equivalent to "finding interpretations for the calculus" or assigning "values" to the symbols. The term "meaning" leaves something to be desired in the way of precision. Morris states: "Meanings were inacessible to observation from without, but individuals somehow managed to communicate these private mental states by the use of sounds, writing, and other signs." *Op. cit.*, p. 123. Carnap states: "It seems...preferable to avoid the word 'meaning' whenever possible because of its ambiguity, i.e., the multiplicity of its designata. Above all, it is important to distinguish between the semantical and the psychological use of the word....We know the meaning (designatum) of a term if we know under what conditions we are permitted to apply it in a concrete case and under what conditions not." Rudolf Carnap, "Logical Foundations of the Unity of Science," *International Encyclopedia of Unified Science* (Chicago: University of Chicago Press, 1955), pp. 44, 49.

[6] "Pointing, despite Emily Post, nails down referents as nothing else can." Stuart Chase, *op. cit.*, p. 173.

[7] *Ibid.*, pp. 10, 104. For an exercise the reader may wish to hunt the complex referents in the following quotations. "In the final analysis, therefore, the great possibility of achieving understanding in the next 50 years is through improved ways of dissemination of the 'economic facts of life.'" Maurice H. Stans, *Handbook of Modern Accounting Theory*, ed. Morton Backer (New York: Prentice-Hall, Inc., 1955), p. 601. "The Eternal Law is a Supreme Being's eternal plan for the universe....The Natural Law is the Eternal Law as known to man by reason. Man knows naturally, by reason, that he must do good and avoid evil." Brother LaSalle, "An Approach to Ethics," *The Accounting Review*, October, 1954, p. 688. "...the Committee believes a statement of accounting concepts should give recognition only to its [a fresh start's] conceptual possibility. That recognition is essential if the application of accounting concepts is to be rational rather than arbitrary." Paul J. Graber, "Report of Committee on Revision of the Statement of Principles, Assets," *The Accounting Review*, January, 1948, pp. 15-16. Perhaps the most discouraging aspect of the following quotation is that the writer is a leader in the crusade for more understandable reports. "It would, furthermore, seem to be in conformity with the direction of accounting evolution to move away from a greater degree of personal judgment based on subjective factors (such as costs artfully constructed by the addition of monetary amounts having different values at different times according to the peculiarly internal design or accident of their incidence) towards a lesser degree of personal judgment based on more objective factors (such as market replacement costs constructed by the addition of monetary amounts

It is difficult to talk of definitions without discussing the process of abstraction and levels of abstraction. For practical purposes in non-scientific work a particular object at which we can point is the lowest level of abstraction. (Some writers feel that such objects are not abstractions at all.) Perhaps the next level of abstraction comes when we paste a label on the object, e.g., typewriter number 11,189, in the office at 779 Rooney Hall.[8] We may then rise to a slightly higher level by using the unmodified term 'typewriter' which includes the set of important properties and relations that are common to typewriter$_1$, typewriter$_2$, typewriter$_3$, ... In this process such characteristics as location, color, height of the operator, the thickness of the dust on the covers, etc., are not important and may be dropped by the abstractive process.

Slightly higher in the abstractive order is the term 'office equipment.' This term includes most typewriters along with many other items. The fact that an object can perform the typing function is not a necessary condition for admittance at this level of abstraction. The term 'asset' is at a still higher level that includes office equipment along with many other objects not ordinarily found in offices. It is not necessary that the object be an item of equipment or that it be used in an office for it to qualify as an asset. In a similar fashion one may proceed to social wealth and perhaps to other more general and abstract classifications. The process of abstraction-omitting characteristics that are irrelevant for the occasion -- is the basis of classification and is necessary for reasoning. In fact it may be argued that all knowledge is made up of abstractions that result from the selective qualities and processes of our senses. Abstraction from all empirical content results in a formal syntactical system devoid of all referents (interpretations).

One of the reasons that political platforms and politican's campaign speeches are so often unsatisfactory is that they are purposely pitched at a very high level of abstraction so that the hearer may substitute his own referents and "understand" what he wants to understand. Demagogues unfortunately have sometimes been able to predict, and manipulate for their own ends, the interpretation that normally will be made. Some individuals tend to use dead level abstraction and talk at a uniformly high level or low level of abstraction. One may define liberty in terms

---

having the same value as of the same time and a 'free' relationship to each other according to the more external circumstances of that one time)." William Blackie, "What is Accounting Accounting for--Now?" N. A. C. A. Bulletin, July 1, 1948, p. 1373.

[8] This is the so-called "thing-language" to which all definitions, relations and constructs must be reducible according to the logical empiricists. For a discussion of "physical language" and "thing-predicates," see Rudolf Carnap, "Logical Foundations of the Unity of Science," op. cit., esp. pp. 52 ff.

of freedom, or God in terms of omnipotent power, or remain at levels so low that the discussion is in terms of particulars with little generality. The principle requirements for clearcut communication may be that the terms can be reduced into less and less abstract terms until the listener arrives at an empirical referent that gives meaning to the statement. "A preacher, a professor, a journalist, or politician whose high level abstractions is not only talking, he is saying something."[9] We must not underestimate the social force of high-level abstractions. Most principles of conduct are at such levels and are difficult or impossible to reduce to simple referents. "A boy in his efforts to live up to the abstraction 'masculine' would try to be virile, dominating, dissipated, chivalrous, overtouchy about his honor, convinced of his intellectual superiority..."[10]

One of the most common confusions of the levels of abstraction is illustrated in the simple statements: This *is* an asset: A car *is* an asset. It should be clear that the first statement makes peculiar use of the word 'is,' for obviously the *word* asset is not the physical object, nor is the *word* car. In the second case the use of 'is' cannot mean identity in the sense that all characteristics are the same in the two classifications. Instead 'is' means in the second case that any car is a member of the set of assets and is silent on whether there are or are not other members of the set.[11]

---

[9] S. I. Hayakawa, *op. cit.*, p. 177.

[10] Stuart Chase, *op. cit.*, p. 203. A similar view is taken by Urban: "The crucial positions of this chapter are: (a) the denial that there is any such things as empty words -- the principle that we cannot talk about anything that is not.... The condition of the meaningfulness of an assertion is not that certain entities about which the assertions are made 'exist' -- in the sense of being empirically observable -- but that the universe of discourse in which these entities have their existence is mutually acknowledged." Wilber Marshall Urban, *Language & Reality* (New York: The Macmillan Company, 1939), pp. 226, 227.

[11] Lee points out four common use of the word *is*: "At least two uses of the verb is are fundamental and necessary in English. 1. As an auxiliary in the formation of tenses in English.. Thus, 'he *is* reading'.... 2. As a synonym for existence.... 'The Capital of the U.S. is at Washington, D.C.'....At least two other uses the verb we find false-to-fact and instrumental in making for confusions and misevaluation. 3. When the 'is' leads to the identification of different levels of abstraction....'Man *is* an animal' ... 4. When the 'is' leads to the predication of 'qualities.' Here we make the assumption that characteristics exist in 'things,' whereas they are to be found only in the relation of an observer to what is observed.... 'He *is* most charitable.' .... This 'is' serves as a synonym for 'appears'...." Irving J. Lee, *Language Habits in Human Affairs* (New York: Harper & Brothers, 1941), pp. 228-229.

Teachers who are fond of the term 'is' are likely to be fond also of a single or two-valued approach to thought -- the single-valued orientation. "This item is either an asset or it is not." "Is it a cost of production or isn't it?" "Smith is a genius or an imbecile." The "either-or" orientation is a useful one for thinking and turns up in formal logic as one of the fundamental rules of formation -- the excluded middle. Nevertheless, in a good part of living we are constantly valuing, appraising, and grading evidence. Notice that what could be an extremely unfortunate aspect of any jury system that requires a guilty or not-guilty decision has been modified by giving the sentencing judge considerable leeway to soften the harsh either-or verdict.[12]

Accountants, as a group, have considerable experience in appraising evidence and drawing probable inferences and are traditionally and understandably reluctant to accept reports without some type of verification. However, accountants and everyone else often accept unverified reports from others including complete strangers. For example, one readily accepts statements that a particular dog is not dangerous, that the rental horse is safe, or that water is available at the next desert stop. To survive in the present complicated world one must accept many reports without verification other than a general faith in the ethical reliability of the general social group. To survive requires considerable discrimination, and such discrimination is in fact exercise of judgment.[13]

Clear comprehension of simple reports may offer difficulties. In addition one of the most common and serious semantic traps results from confusing someone's inference or judgment for a report. We infer from a current ratio of seven to one that the firm will have no immediate shortrun debt-paying difficulties. We infer from the client's attitude toward deficit financing that he is a Republican. From a report that the controller and the sales manager are not speaking we infer that there is ill will between them. We infer from a sample of 300 inventory items that the inventory value is substantially correct.

It should be clear that an inference may be based on much or little experience, may or may not be aided with the latest statistical pronouncements on sampling, and may or may not have a high probability of being an inference that is useful for living. Simple existence at the animal level requires untold numbers of inferences. (A cat may infer danger from the presence of a strange dog.) The fantastic number of required inferences means that not all are made with high degrees of probability. In many cases the care with which the inference is made bears some relationship to

---

[12] A gentle criticism of the two-valued orientation and logic is implied by this statement attributed to Lin Yutang: "A is right, but B is not wrong."

[13] Different social groups vary widely in the reliability of their reports. Morris Cohen remarks: "Empirically....it is true that lying is subversive of that mutual confidence that is necessary to all social cooperation. And this justifies a general condemnation of lying -- but not an absolute prohibition." Reason and Nature (Glencoe: The Free Press, 1953), p. 433. Most major religions encourage accurate reporting.

the seriousness of making a wrong inference, but this generalization may be subject to many exceptions. (See the essays devoted to evidence and proof for a more detailed discussion.)

Judgment is used by some semanticists to mean what are commonly understood to be value judgments, e.g., "expressions of the writer's approval or disapproval of the occurrences, persons or objects he is describing."[14] A little reflection shows that difficulties may arise from confusion of a report and a judgment. For example, the statement: "Our client lied about his payables." may easily be mistaken for a factual report, but it is both an inference and a value judgment. "Lied" itself implies that our client was aware that his statement was false and the listener normally draws this inference. Moreover, it is probable that the speaker disapproves of lies and liars, so that for many people the statement is also a condemnation. A report would state simply that the client stated payables to be $8,000, and payables amounting to $11,000 were in existence at that time.

The accountant and the accounting teacher should be especially competent at weighing evidence and rendering reports designed to initiate desirable action. In fact public accounting is a profession devoted almost entirely to weighing reports from individuals, combining them in meaningful ways, and vouching for their reliability. The form and arrangement of reports are designed to evoke desirable action from those who use them. The choice of events to be recorded is the result of value judgments. The degree of abstraction and the amount of detail (particulars) are adjusted to the pragmatics of reader reaction in light of accepted goals. The tentative nature of induction from specific instances is invariably close to the surface. The subjective aspects of evidence, judgment, reporting, and even facts are encountered daily by the active accountant. The weaknesses of human beings under stress and their tendency to color their reports by ego-saving slanting are on display daily for accountants to observe. In spite of these pressing influences, accountants and teachers of accounting continue to stress some clearly archaic techniques for record keeping, and their students remain ignorant of even the name "semantics."

---

[14] S. I. Hayakawa, op. cit., p. 42. Notice the following statement. "...even the simplest sensations involve some judgment.... When...this judgment is of so simple a kind as to become wholly unconscious, and the interpretation of the appearances is a matter of general agreement, the object of sensation may...be considered a fact." George Cornewall Lewis, "Matters of Fact and Opinion," reprinted in The Language of Wisdom and Folly, ed. Irving J. Lee (New York: Harper & Brothers Publishers, 1949), p. 65. Bertrand Russell states: "Everything that there is in the world I call a 'fact'....but it is not called 'cognitive' until it reaches a certain level of development." Human Knowledge, Its Scope and Limits (New York: Simon & Schuster, 1948), p. 143.

ACCOUNTING SEMANTIC DIFFICULTIES

The previous essay is devoted to some elementary and general comments about the difficulties of semantics, pragmatics and communication.[1] We are concerned here primarily with specific barriers to understanding that are sometimes encountered in discussions of accounting subjects. Some specific quotations and usages are used to illustrate specific shortcomings, although these quotations were written by writers with superior communicative ability.

---

[1] It is not the intention to give a general approach to the use of signs, languages, and communication systems. The following references may prove helpful to those who wish to consider the subject more intensively. The outstanding early work is C. K. Ogden and I. A. Richards, The Meaning of Meaning (New York: Harcourt, Brace and Company, Inc., 1938). Their well-known illustration of the usefulness of syntax (grammar) on p. 46 may deserve repeating. "Suppose someone to assert: The gostak distims the doshes. You do not know what this means; nor do I. But if we assume that it is English, we know that the doshes are distimmed by the gostak. If, moreover, the doshes are galloons, we know that some galloons are distimmed by the gostak." Charles W. Morris in "Foundations of the Theory of Signs," International Encyclopedia of Unified Science (Chicago: University of Chicago Press, 1955), pp. 114, 88 argues: "....a language is a social system of signs mediating the responses of members of a community to one another and their environment....Thus the formalist is inclined to consider any axiomatic system as a language, regardless of whether there are any things which it denotes, or whether the system is actually used by any group of interpreters; the empiricist is inclined to stress the necessity of the relation of signs to objects which they denote and whose properties they truly state; the pragmatist is inclined to regard a language as a type of communicative activity, social in origin and nature, by which members of a social group are able to meet more satisfactorily their individual and common needs." An extreme position as to the usefulness of language in society is taken by Leonard Bloomfield, "Linguistic Aspects of Science," International Encyclopedia of Unified Science, op.cit., pp. 233, 239. "Much as single cells are combined in a many-celled animal, separate persons are combined in a speech community -- a higher and more effective type of organization....The ordering and formalizing effect of language appears, first of all, in the fact that its meaningful forms are all composed of a small number of meaningless elements." Electrical engineers and others have made a major point of the tendency to degeneration (enthropy) and have made provision for the introduction of "noise" and probability into the communication system. See, for example, Norbert Wiener, Cybernetics; or Control and Communication in the Animal and the Machine (New York: John Wiley & Sons, 1948), or The Human Use of Human Beings: Cybernetics and Society (Boston: Houghton Mifflin Co., 1950) esp. Chapter 1.

Perhaps the worst offender in the field of accounting is the term "true." The true propietary equity is $326,600. The true cash balance on December 31, 1962, is $45,000. The annuity method of amortizing costs does not show the true depreciation expense. The use of LIFO does not permit reporting the true periodic profit of the concern. The examples may be multiplied almost indefinitely.

What is the "true" cash balance? Are the bank balances cash or a specialized type of receivable? Do outstanding checks reduce the cash balance or should they be added to the book cash for presentation of cash in a financial statement? Is the change fund in the registers cash? Are advances in the hands of salesmen cash or something else?

Which income is the "true" income? Are all value increases income? Must value increases be supported by realization? Does true income accrue as work progresses? Do Lifo and Fifo both give true income? Do variations in the methods of taking depreciation yield "false" income? Is it necessary to anticipate future sales discounts to procure a true profit? Does consideration of imputed interest on proprietary investment make the reported income false? Is the true loss on spoiled units the difference between their sales value as firsts and their value as seconds or scrap? The absurdity of putting fear into the hearts of sincere opponents by implying in this manner that their proposals lead to false results is obvious. Yet some folks are convinced by such statements; otherwise some authors of considerable prestige would be run out of town. Let us now give some attention to the term "true" and its kin "truth."[2] There is certainly an area of discussion in which it is useful to point out the truth or falsity of an assertion, but the important lesson for accountants, and many others, is that this two-valued orientation is useful when a substantial part of the controversy (argument) is finished and the parties in opposition are agreed as to what shall constitute meeting the test or goal (true) and falling short of meeting the test or goals (false). There may still be controversy as to whether a particular statement or proposition meets the tests or does not, but this argument is on a very low level of abstraction and is entirely apart from setting the standards or tests that must be met before qualifying as true. The point to be emphasized is that it is next to foolishness to claim that one definition of income is true and the alternatives by implication are false. Moreover, such argument when done consciously is one of the more unethical forms of argument.

The difficulty of course is that philosophers have had trouble deriving an acceptable concept of true and even more difficulty with truth. One approach tries to tie the concept to the syntactical or logical domain and to limit it pretty much to procedures that are consistent with the rules of logic that happen to be adopted. Truth and falsity, according

---

[2] As an exercise try to find the referents for the motto of at least two great universities: "Seek ye the truth and the truth shall make ye free." Comment also on the status conferred by using the peculiarities of medieval spelling in the twentieth century.

to this view, are properties of propositions and are therefore linguistic. Even this procedure does not result in a clearcut construct. The true-false of a truth-table, for instance, may be entirely conventional and need not represent true or false at all in any usual sense. They can just as well be the symbols 'T' and 'F'. The interpretation of 'T' and 'F' need have nothing to do with what most students conceive to be true or false so long as they are by definition contradictories in the sense that they meet the prohibition that they not be asserted together, e.g., meet the tests for manipulating the symbols that have been adopted in the logic. Thus a mathematician may establish a requirement that set membership rules be unambiguous. Notice, however, that mathematics in the pure sense is not able to determine whether or not in a particular case the membership requirements are sufficiently well-defined so that a given intellect can in fact make the discrimination. The latter requirement is empirical and depends on the discriminatory power of the individual. Yet to stick to the concept of logical-truth clearly has no use except to point out whether the manipulation has been done according to the rules that have been adopted. It is sufficient to assume that the user of logic has enough discriminatory power to be able to imagine T and F. The translation of these symbols into true and false in the empirical sense is an interpretation and not a part of mathematics.

Thus logic and mathematics tend to yield "truth" by definition or convention. "'Two plus two are four' because all that this statement says is that 'four' is the name of 'the sum of two and two.'"[3] It is generally understood that both mathematics and logic are verbal in nature and that the names of numbers, the operations and symbols can be defined without any of the references to the numbers that we normally assume. The assignment of the number 'two' to the class of all classes that are similar to a given couple is definitional (conventional), but to be useful the definition needs interpretation and requires the empirical or psychological ability to determine similarity, i.e., put things in a one-one correlation.[4]

The meaning of true to most readers is probably in the semantic aspects of language in that true or false are used to indicate whether

---

[3] S. I. Hayakawa, Language in Thought and Action (New York: Harcourt, Brace and Co., 1949), p. 240. Notice also: "...the only way to guarantee the 'truth' of logically deduced statements and to arrive at agreements through logic alone is not to talk about actual cats at all, and to talk only about cats-by-definition. The nice things about cats-by-definition is that, come hell or high water, they always meow (although, to be sure, they only meow-by-definition)." Ibid., p. 241. See also Vilhjalmur Stefansson, "Knowledge by Definition," reprinted in The Language of Wisdom and Folly, ed. Irving J. Lee (New York: Harper & Brothers Publishers, 1949), pp. 85-92.

[4] See for example, Bertrand Russell, Introduction to Mathematical Philosophy (London: G. Allen & Unwin, 1919), esp. Ch. II . The similar concept of "mapping" is used by Irving Adler, The New Mathematics (New York: A Mentor Book, 1960), pp. 14 ff.

the report agrees or does not agree with the empirical data involved. Morris states:

> ...discussions of the term 'truth' have always involved the question of the relation of signs to things....In general, from the point of view of behavior, signs are "true" in so far as they correctly determine the expectations of their users, and so release more fully the behavior which is implicitly aroused in the expectation or interpretation.[5]

While we may not agree with Chase that: "In a given context a statement may be true or false, but there is no such entity as 'truth,'"[6] we must be prepared for difficulty when we try to define the generalized term 'truth.' Russell is in essential agreement with Morris: "When we say that a sentence is 'true,' we mean to say something about the state of mind of a person uttering or hearing it with belief. It is in fact primarily beliefs that are true or false..."[7]

If accountants agree with mathematicians and scientists to accept certain terms as having definite meaning and agree on the rules of formation and transformation (logic) the truth or falsity of a conclusion can be established so long as they stay within the framework of the definitions and agreed procedures. Note however that when the empirical or experiential world is considered the agreement is relative, and the

---

[5] Charles W. Morris, op. cit., pp. 99, 111. The danger of such a relativistic approach to truth is lessened by the interpersonal comparisons necessary for objectivity. Morris states: "A peculiarly intellectualistic justification of dishonesty in the use of signs is to deny that truth has any other component than the pragmatical, so that any sign which furthers the interest of the user is said to be true....Dewey has specifically denied the imputed identification of truth and utility." Ibid., pp. 118-119. Notice also: "Semantics presupposes syntactics but abstracts from pragmatics..." Ibid., p. 101.

[6] Stuart Chase, The Tyranny of Words (New York: Harcourt, Brace and Company, 1938), p. 88.

[7] Bertrand Russell, Human Knowledge, Its Scope and Limits (New York: Simon & Schuster, 1948), p. 112. Hayakawa distinguishes four different meanings of the term 'true,' but he combines pragmatics with semantics. "'We may distinguish at least four senses of the word 'true': Some mushrooms are poisonous. (If we call this 'true,' it means that it is a report that can be and has been verified...) Sally is the sweetest girl in the world. (If we call this 'true,' it means that we feel the same way towards Sally...) All men are created equal. (If we call this 'true,' it means that this is a directive which we believe should be obeyed...) $(x + y)^2 = x^2 + 2xy + y^2$. (If we call this 'true,' it means that this statement is consistent with system of statements possible to be made in the language called algebra...)" Op. cit., p. 292.

truthfulness of a report can therefore be only tentative or probable. If all agree that there is only one god, Jehovah, and that his only major prophet is Allah, it is not ridiculous to assert the truth of the proposition that Ormazd (or any other non-Allah) is a false god and that his prophets are imposters, i.e., not major prophets. Likewise if all agree that straightline depreciation on a ten-year basis without consideration of residual values is necessary for a true income figure, then it is proper to thunder that the application of activity methods of depreciation will lead to false income figures. True income, in this case, is the results derived from applying the agreed rules of observation, recognition and measurement. Claiming truth for one set of acceptance rules often by implication treats the results of alternative rules as false. Far too often the result is question begging, for the point at issue is usually the superiority of one set of rules over the others.

The terms "logic," "logically," and "logical" are often used in accounting literature. Advocates of a particular method of costing inventories are "throwing logic to the winds." Straightline depreciation may not be "strictly logical, but..." "The logic of the situation dictates" that we treat purchase discounts as cost reductions. The examples may be extended at length. What are the writers saying? The reader has some rights and among them seems to be the freedom not to endure -- in Chase's words -- "unintelligible noises." Too often the unsophisticated reader accepts the authority that the term "logic" has gathered through the years and renders his decision against superior evidence. The unsophisticated reader who needs to weigh the evidence on an unemotional and non-authoritative basis is the person who is most easily deceived by the honorific connotations of such words, and unfortunately textbooks are among the worst offenders.

It is the function of logic generally to give the accepted rules for getting new sentences from old. These rules set the path for determining what transformation may be asserted and what other transformations or combinations cannot be asserted jointly without leading to violations such as contradiction. Logic also may help in the manipulations that are necessary to wrangle new sentences (propositions) from old, and it may help in testing whether a given sentence may or may not be asserted from the previous sentences (giving proofs). This function must not be under valued for it may well lead to new insights. Carnap states:

> Though logic cannot lead us to anything new in the logical sense, it may lead to something new in the psychological sense. Because of limitations on man's psychological abilities....the psychological abilities content (the totality of associations) of one of these new sentences may be entirely different from that of the other.[8]

---

[8] Rudolf Carnap, Introduction to Symbolic Logic and Its Applications (New York: Dover Publications, Inc., 1958), pp. 21, 22. Notice also by the same author: "The chief function of a logical calculus in its application to science is not to furnish logical theorems....but to guide the deduction of factual conclusions from factual premises." Foundations of Logic and Mathematics (Chicago: University of Chicago Press, 1939), p. 35.

The point to be emphasized is that logic, strictly speaking, is not concerned with the truth or falsity of empirical statements about the observed world. Logic cannot possibly tell us that if market values are important when they are below cost, they must also be important when they are above cost, or that the valuations used for determining income must also be used for determining financial status. Chase has stated:

> Logic is a set of rules governing *consistency in the use of language*. When we are being "logical" our statements are consistent *with each other*; they may be accurate "maps" of real "territories" *or they may not*, but the question whether they are or not is *outside the province of logic*. Logic is language about language, not language about things or events.[9]

It is probably true that accountants and other reasonably educated people make comparatively few mistakes in their use of formal logic. Now and then one forgets that a proof of the inverse does not prove the original statement or that the proof of the contrapositive does not prove the converse, but even these somewhat technical details are violated considerably less than one might suppose. When the rules of logic are violated, the violator should certainly be called to task. What is objected to here is the use of the prestige of the term "logic" as a psychological (pragmatic) weapon. Words have images and "logic" sometimes incites an intellectual Jehovah image and is thus well suited for propaganda purposes.[10]

Apparently many non-logicians use "logical" in a completely different sense. "Logical" action is often related to goals and objectives. Thus a person exhibits logical behavior when his actions tend to lead to goal attainment. He is illogical when his actions seem to subvert his objectives. In this usage "logical" becomes a synonym for *rational behavior*, which itself is poorly defined. Thus (by extension) if one argues that the cost-or-market rule is illogical, he may mean

---

[9] Stuart Chase, *op. cit.*, p. 240. Carnap comments: "Logic...is concerned with *relations between* factual sentences (or thoughts). If logic ever discusses the truth of factual sentences it does so only *conditionally*, somewhat as follows: *if* such-and-such a sentence is true, *then* such-and-such another sentence is true. Logic itself does not decide whether the first sentence *is* true, but surrenders that question to one or the other of the empirical sciences." "The Condition of Clarity," reprinted in *The Language of Wisdom and Folly*, ed. Irving J. Lee, (New York: Harper & Brothers Publishers, 1949), p. 44.

[10] This essay avoids entirely the so-called diction and non-diction fallacies of Aristotle. These pitfalls deserve to be studied carefully by any aspiring accountant. Those concerned with diction are: ambiguity, amphiboly, combination, division, accent, figure of speech. Fallacies out of diction are: accident, confusions of absolute and relative, ignorance of the refutation, begging the question, consequent (converse proof), false cause, and that of many questions.

that the results derived from applying the rule tend to thwart the objectives of the overall measurement system. In this extended sense logical becomes a synonym for "consistency," where "consistency" is defined to mean helping and not hindering the goals of the information system.

Far too often, in practice, the terms science and scientific are used in a tyrannical manner and confuse rather than clarify exposition. Most folks do not like to be thought of as unscientific, for in our present society science enjoys -- and with merit -- the highest intellectual status. Few can doubt that the rigorous application of scientific method has been one of the crowning intellectual achievements of the past few centuries. The essence of science is concerned with organizing and relating experiences by admitting evidence only if it can be checked at the referent (data) level by replication or by any competent individual.[11]

It is not the object of this discussion to examine the possibilities that accounting may be treated as a bona fide science. Instead it seems sufficient at this time to point out that the use of "scientific" like the use of "true" and "real" often results in conscious or unconscious slanting. No one likes to buck the prestige of the term "scientific," and to use the label by implication tends to make alternative procedures or suggestions appear to be unscientific and therefore less acceptable. Certainly not all of traditional accounting meets the tests of continual checking at various levels of abstraction with referents, but accountants are acutely aware of the prestige resulting from being considered to be scientific, and they may cite with approval the following statement by Pearson: "The unity of all science consists alone in its method, not in its material. The man who classifies facts of any kind whatever, who sees their mutual relation and describes their sequences, is applying the scientific method and is a man of science."[12]

To the extent that one's opponent is violating certain rules of scientific and rational behavior, we have a right to call him unscien-

---

[11] The problems of scientific method are treated elsewhere but note: "In science, this interplay [between higher and lower levels of abstraction] goes on constantly, hypotheses being checked against observations, predictions against extensional results." S. I. Hayakawa, op. cit., p. 179. Morris Cohen, "The true [sic] method of science is to cure speculative excesses, not by a return to pure experience devoid of all assumptions, but by multiplying through pure logic the number of these assumptions, mathematically deducing their various consequences, and then confronting each one with its rivals and such experimental facts as can be generally established." Reason and Nature, op. cit., pp. 39-40. "In order that a conception may have scientific validity, it must be self-consistent, and deducible from the perceptions of the normal human being." Karl Pearson, The Grammar of Science (Everyman ed.; London: J. M. Dent & Sons, Ltd., 1937), p. 49.

[12] Karl Pearson, op. cit., p. 16.

tific, point out his failures and let him suffer the unpalatable consequences. Accountants are on more doubtful ground when they refer to the compound-interest methods of amortizing assets or equities as being scientific. Straightline depreciation, per se is no more or less scientific than the annuity method, and the approach to the Vallhalla of pure science is not necessarily measured by the complexity or modernity of the mathematics employed.

One of the common misuses of words in accounting is found in connection with the term "distortion." We may use for an example the following statement from Gilman, but similar statements may be taken from a dozen leading authorities. "It is difficult to escape the conclusion that this [LIFO] and its companion, the base-stock method...are intended deliberately to stabilize, or in other words distort, profits..."[13]

One has only to inquire: distorted from what? The unsatisfactory use of the term becomes obvious with the asking of the question. Certainly LIFO "distorts" the profit figures when measured from the amounts that would result from the application of FIFO as a norm. It is just as clear that the use of FIFO or an average method "distorts" the figures that would result if LIFO or any other method were used. Clearly such argument can not be expected to improve understanding.

Perhaps the most serious objection to the use of distortion and similar words is that they tend to obscure the fact that the whole controversy is actually over the definition of income. The problem at issue in these instances, is to determine the most desirable alternative for measuring income and for presenting the results. These alternatives are determinants of income and each implies a different attitude toward the usefulness of the resulting income. It is manifestly absurd to assume a "proper" definition of income and criticize a particular alternative because it fails to conform to this definition. The result is a plain begging of the question -- one of the most obvious violations of informal logic.

Accounting literature is full of sinister admonitions for accountants to avoid recording and reporting in such a way as to "distort" something or other. Suppose that a client who has been reporting reasonably constant income figures encounters a bad year and asks his accountant for permission to hold the sales register open for a few extra days so that his reported revenues and income will not be distorted from their previous pattern. Our quick curbstone reply is likely to point out that a "natural" change in reported income is not distortion and holding open the register would lead to distortion. The difficulty a-

---

[13] Stephen Gilman, Accounting Concepts of Profit (New York: Ronald Press Company, 1939), p. 398. Gilman elsewhere explains distortion: "Distortion as used here refers to distortion from a traditional base founded upon original accounting conventions." Loc. cit. "Artificial tinkering with reporting profits" is a similar type of objectional statement.

rises from the uncertainty about the base from which deviation is measured. Correction of past periods' profits through current income accounts may lead to distortion only in the sense that someone has agreed on what the usual pattern should be or at least what the determinants of the pattern are. On most problems that are worthy of discussion we have not reached the required degree of agreement, and consequently such words as distortion confuse instead of clarify the issues.

The use of 'distortion' and similar words have a slanting effect that is highly undesirable. It puts the accused in the light of being an advocate of distortion -- by implication an undesirable position. This tyranny of words with automatic slanting is perhaps not as acute here as it is when the terms "progressive," "liberal," "sound," etc., are used. The appropriation of the term "progressive education" has had a tremendous psychological effect. Many individuals wish to be considered progressive and consequently dislike the thought of being considered unprogressive (or, perhaps worse, reactionary). While many may not be so sensitive, there must be many educators who follow the progressive line not because they are genuinely sympathetic toward a majority of its aims but because they react favorably to the label "progressive" and negatively to its opposite.[14]

It is not uncommon to observe the use of the terms "in theory" or "theoretically" in the literature of accounting. "In theory it is correct to add some fixed burden to machinery constructed for the firm's own use." "Theoretically expected sales allowances should be anticipated and taken in the period during which the sales are registered." Ideally, interest paid or accrued during the period of construction should be charged to the asset." And so on without "practical" or "theoretical" limit!

The use of "in theory," "theoretically" and similar terms is not objectionable if attention is being drawn to an accepted set of goals and practices that should lead to these goals. If the contrasting practice does not seem to accomplish the objectives, it may be the practitioner has weighed the consequences against the saving in effort and substituted alternative goals. Theory versus practice is not refined procedure versus crude procedure. There is to my knowledge no directive calling for wasting valuable human resources in order to conform to "good theory."

Theory is, of course, a very highly abstract term -- perhaps among

---

[14] Human faith in the benefits of progress, regardless of the direction of the progress seems to be based on the thinking of the enlightenment. At that time, the leaders of the new movement felt that the human being was essentially a good person, and the progress that would result if the sultifying influence of the Church could be removed was bound to be toward betterment. Even today "progressive" is an "honorific" (the term is Veblen's) term and its opposites are mild forms of castigation.

the highest.[15] Fortunately individuals are divided as to the honorific value of being theoretical. In some circles to be considered theoretical is to be considered brilliant and learned; in other circles theoreticians may be considered to be incompetents who spend their time in emasculating words and meaning. No doubt all kinds of variations may be found, but on balance it appears that to use 'in theory' or 'theoretically' often makes an argument more palatable and convincing to the reader. Presumably those who admire theory and theorists ~~who~~ would be impressed and those to whom theory is anathema would be repelled. In most cases the result is probably one of slanting, but the direction of the slant may sometimes be vague.[16]

---

[15] The term 'fact' is itself an abstraction, and of course such words as 'principle' and 'theory' are high-level abstractions. Some writers feel that the term 'theory' is so poorly defined that it must be reconstructed or abandoned. As a rule the term 'theory' in science is used to include the entire assemblage of primitive terms, definitions, relationships, logical calculus, and rules of correspondence. Warren S. Torgerson states: "...the set of constructs with their formal connections forms a model. When certain of the constructs are connected to the empirical world by rules of correspondence, the model becomes a theory, and, as such, is subject to empirical test." Theory and Methods of Scaling (New York: John Wiley & Sons, Inc., 1958), p. 4. William J. Goode and Paul K. Hatt are more explicit. "A fact is regarded as an empirically verifiable observation....theory refers to the relationships between facts, or to the ordering of them in some meaningful way.... Theory is a tool of science in these ways: (1) it defines the major orientation of a science, by defining the kinds of data which are to be abstracted; (2) it offers a conceptual scheme by which the relevant phenomena are systematized, classified, and interrelated; (3) it summarizes facts into (a) empirical generalizations and (b) systems of generalizations; (4) it predicts facts; and (5) it points to gaps in our knowledge." Methods in Social Research (McGraw-Hill Book Company, Inc., 1952), p. 8. DR Scott states: "Some hold that practice of the profession cannot be controlled by any formulation or general acceptance of principles. Others hold that accounting practice may be standardized and controlled by generalized rules based upon such practice. The first view in effect denies the existence of accounting theory....The second view looks upon accounting theory as a body of rules or generalizations which summarizes the experience of the profession. "Accounting Principles and Cost Accounting," The Journal of Accountancy, February, 1939, p. 75.

[16] Similar uses of "realistic," "real," and "appeals to facts," etc., are so common in accounting that illustrations do not seem necessary. "...LIFO has no logical factual basis whatever..." Arthur C. Kelley, "Can Corporate Incomes Be Scientifically Ascertained?" The Accounting Review, July, 1951, p. 292. "The primary purpose of this procedure [cost assignment] is to insure a realistic valuation for inventories -- and therefore a realistic measurement of profit." John A. Beckett, "A study of the Principles of Allocating Costs," The Accounting Review, July, 1951, p. 328. "The real significance of equities of this character is to be found in the restrictions they impose upon the asset fund..." W. J. Vatter, The Fund Theory of Accounting and Its Implications for Financial Reports (Chicago: University of Chicago Press, 1947), p. 20.

Accountants and others have vacillated between the extremes of believing that consistency is the sine qua non of effective argument and holding with a famous philosopher that consistency is the hobgoblin of small minds. As a rule accountants seem to favor the former attitude rather than the latter, and recently auditors have pegged one of their most iron-clad rules to the "principle" of consistency. Let us start with the use of the word in formal logic and mathematics and examine the usual meanings of the term.

Mathematicians and logicians are vitally concerned with the consistency of their premises and fundamental operations. Consistency in these areas means that the sentences may be asserted jointly and that there is no contradiction, e.g., it is not possible to deduce that a is equal to b and a is not equal to b from the same premises and with approved operations.[17] Unfortunately in many types of ordinary discourse the wording is so loose and the levels of abstraction so confused that it is not feasible or even possible to perform the necessary operations to show whether contradiction -- inconsistency -- exists.

The term consistent can also be used to express uniformity in behavior patterns, and it is in this area that accountants, and many others as well, often go astray. This aspect of the term can take two somewhat different courses. First, it can be akin to conservative in that the actor does the same thing in the same way each time as if the surrounding conditions set the pattern, and for the actor to break the routine is to lead to "contradictory" behavior and therefore to be inconsistent. While the desire to emulate the logicians may be strong, in general this use of the term must be applied with care. Are auditors, for example, inconsistent if they start an audit on January 17 of one year and January 27 of another? Is an auditor inconsistent if he wears a blue suit one day and a grey the next? Are accounting firms guilty of inconsistent behavior when they change the personnel on particular audits from year to year? By this definition any change in behavior involves inconsistency!

Clearly there are no convincing reasons why each of the above cases should be considered to be inconsistent. In day-to-day operations individuals use the term to indicate the relation of their activities to their objectives. In other words they select those areas of behavior where it is considered important that there be few deviations and apply the terms "consistent" or "inconsistent" to them. It may be desirable, for example, for audits not to start on the same day year after year, and it may be desirable to change the personnel for the audit crew from time

---

[17] "The first advantage of logical system is that it helps to eliminate inconsistency between the propositions which it includes....Sensitiveness to contradictions is an essential characteristic of the man of science, and logical method is a way of forcing contradictions into the light. Common sense tries to achieve consistency by alleging reasons for what it wishes to believe. But if we fail to bring all these reasons together into a system we are bound to rely on inconsistent reasons at different times..." Morris R. Cohen, op. cit., p. 109.

to time. The point is that the goals or conditions must be set and that deviate action must be important enough to isolate.

Let us now look at the famous "in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year." The emphasis on undeviating behavior through time is unmistakable. Apparently there is no implication of consistency in the logical sense of contradiction, and none is presumably intended, although there may be some reluctance to sign such an opinion at the end of the first year.[18]

There is still a third manner in which consistency is used by writers in accounting, and it is a most objectionable use of words for tyrannical effect. This strange usage is a kind of reversibility without counterpart in logic, mathematics or the canons of good language. It is asserted, for example, that if market is important when it is below cost it must also be important when it is above cost. There is of course no imperative in logic or psychology or in accounting usage that supports such a position. We might just as well assume that, if market is important when it is lower than cost, under no circumstances should market be important when it is above cost. Which one, if either, shall we use? It turns out that the orthodox cost or market rule is in harmony with the generally accepted rules for recognizing gains or losses. That is, gains must pass the tests of realization and losses require somewhat less rigorous evidence to support their recognition. In terms of the broader doctrines of loss and gain recognition, the cost or market rule may be said to be consistent for it does not violate the more general rules for gain and loss recognition. Advocates of cost or market are not throwing "logic to the winds" or being "grossly inconsistent."

---

[18] The following statements indicate views from accountants on the application of consistency to the field.

"To be consistently in error is to be consistent, to be sure, but it is in defeat of the ultimate goal of accounting: truth in reporting." M. A. Binkley, The Limitations of Consistency," The Accounting Review, October, 1948, p. 374.

"To be 'consistent' with the preceding year, it should not be enough to say that the accounting principles of both the current and preceding year are acceptable and therefore the principles are consistent.... 'consistent' as employed in the accountants' opinion should mean reasonable adherence to the accounting principle applied by the company to a specific item or class of items in the previous year." Daniel Borth, "What does 'Consistent' Mean in the Short Form Report?" The Accounting Review, October, 1948, p. 373. "Consistency, it will be observed, refers especially to uniformity of practice in two succeeding years, so that the results shown are truly comparable." Thomas H. Sanders, "Progress in Development of Basic Concepts," Contemporary Accounting (New York: American Insitute of Accountants, 1945), p. 20.

The reader may ask himself some questions of the following type to convince himself of the futility of this type of argument. Is a swimmer inconsistent because he inhales when his face is above water and does not inhale -- except on rare and unfortunate occasions -- when his mouth is below water? Is anyone concerned about the inconsistency of most animals because they breathe faster and deeper when they are climbing a hill than when they are descending? If a plant writedowns are charged to retained earnings does it follow that plant writeups should be credited to retained earnings? Is it inconsistent to develop one set of rules for recognition of profit and another less rigid set for recognition of loss? Is it consistent to have a statement of profit and loss when the total must be either a gain or loss (zero excepted) but when dozens of individual losses and profits may be shown in the statement? Is it inconsistent for increases in assets to be debits while increases in equities are credits?[19]

Recently a speaker was condemning British policy because, it was asserted, the policy has been fantastically inconsistent. He attempted to convince his audience that the policy should be condemned because the diplomatic machinery has been directed against France under Napoleon, against Russia in the Crimean trouble, with France and Russia and against Germany in the world wars of the twentieth century, and now, at least in part, against Russia once more. What could be more vacillating? More inconsistent?

British foreign policy may or may not have been objectionable to an American for many reasons, but from a slightly different point of view the policy appears to be a masterpiece of consistency. In each case the attitude has been hostile to what seemed at the time to be the strongest and most aggressive power on the continent. The point to be emphasized is that the kind of consistency to be cherished is consistency of procedures and assumptions toward a defined goal. A skipper of a sail boat is not to be condemned if he veers from right to left when sailing into the wind

---

[19] "Consistency is not necessarily a hallmark of accuracy but where a technique is conceded to be accurate in periods of rising prices, there should be at least a presumption that it will be accurate if consistently applied in periods of falling prices." Edgar O. Edwards, "Depreciation Policy under Changing Price Levels," The Accounting Review, April, 1954, p. 278. "As it is a general rule that unrealized profits are to be excluded from income, it represents an inconsistency to account for unrealized losses such as the writedown of inventory values to lower market prices." K. Engelmann, "The 'Lifo-or Market' Plan," The Accounting Review, January, 1953, p. 57. Paton has long been a user of consistency in the sense of reversibility. "In the first place this basis [cost or market] of valuation is inconsistent, and inconsistency is the very antithesis of sound accounting. The rule recognizes the significance of market quotations when prices decline but denies that they have any bearing on the interpretation of the financial condition and progress of the business when the movement is in the other direction." William A. Paton and William A. Paton, Jr., Asset Accounting (New York: The Macmillan Company, 1952), p. 83.

if his objective requires that he progress in the direction from which the wind is coming. We may conclude that in many of its uses the charge of inconsistency is a prime example of the tyranny of words. The uninitiated may be impressed, but intelligent readers may be alienated, and certainly all deserve better treatment.

Let us now turn to another area of misunderstanding and poor communication. The following quotation -- which is in no way unique -- will serve to illustrate the field. "In general the actual circumstances rather than hard and fast rules as to percentage of stock ownership should be permitted to settle the matter of consolidation or nonconsolidation."[20]

We may skip over the obvious fact that "actual circumstances" cannot "settle" a question any better than "hard and fast rules" alone can settle a controversy. The question that should concern us is how are we to permit "actual circumstances" to influence our judgments (Presumably "to settle" means to discriminate, to judge, and to classify.)

It seems fair to say that almost all rules and standards except perhaps those in pure mathematics and formal logic relate to some characteristics and circumstances. We judge whether an object is a house or a wheelbarrow, for example, by comparing "actual" characteristics (circumstances?) with those used in setting up the definitions of house and wheelbarrow. And we judge -- to cite another example -- whether a soccer game is played fairly or unfairly by comparing actual behavior patterns with the "hard and fast" (written and unwritten) rules for the game of soccer. More precisely, we may say that actual circumstances are a necessary part of any judgment discrimination or classification unless we are dealing with entirely hypothetical cases. Thus there is no opposition between circumstances and rules and the two are complementary -- not alternatives -- for reaching a decision. One who avoids the facts or actual circumstances is dealing in abstractions and hypothethical instances -- he is not going back to referents.

What would happen if the use of hard and fast rules is avoided? How can any decision whatever be reached if there are no rules, standards, conventions, class boundaries, or general guideposts of some kind? Obviously no decision is possible with the usual "if...then" restriction. Perhaps with less hard and fast rules we get decisions that are less firm and definite, until with no guides, we get no decision.

For another example the reader may wish to analyze the meaning of the following. "Each case must be judged on its merits, cold comfort indeed for those who need or require rules and formulas to guide their footsteps."[21] We may ask questions of the following nature. What "merits" are to be considered in reaching the judgment and what characteristics (merits) are to be rejected? How is the judge to weight the

---

[20] William A. Paton and William A. Paton, Jr., Corporation Accounts and Statements (New York: The Macmillan Company, 1953), p. 577.

[21] Maurice Moonitz, "Adaptations to Price-Level Changes," The Accounting Review, April, 1948, p. 144.

various merits (and demerits)? Are not rules and formulas set up to guide the selection, rejection, and relative weighting of characteristics (merits and demerits)? Has the writer (perhaps in related discussion and context) given general objectives and goals so that there are vague signposts that point the directon?

In regard to these kinds of statements it may be concluded that: (1) the objectives and goals are so fuzzy and ill-defined that there is no direction; or (2) the roads are so confused that there is no order in them whatsoever and therefore no guides for our "footsteps;" or (3) by reflecting long enough on the facts of the case (somehow all good things come to him who cogitates) the light will be revealed.[22]

The last possibility is apparently the view of those who feel that an array of facts sooner or later suggest relationships and guidance. This view is held, for example, by a number of so-called institutional economists and many in the fields of sociology, government and psychology. Scientists realize that gathering all facts in even a narrow field is obviously impossible and that a group of facts may be selected for testing a given hypothesis or they may be selected at random or any other manner, but it is clear that it is impossible to gather *all* the facts, and it is clear that a more or less random sample may or may not be an efficient method of finding out some relationship. Many investigators seem to be interested in facts themselves (low-level abstractions) and are not interested in relationships or generalizations of a more abstract kind or in predictability, but on balance these folks probably are relatively few and waste an unimportant part of mankind's mental resources. It simply does not make sense to ignore all prior knowledge above the fact level and not use it as a tool for investigation. Moreover, facts require simple judgments, and the selection and rejection of relevant and irrelevant facts must be done even though the goals are not clearly defined and the bases for acceptance and rejection are only vaguely understood. "Just give me the facts" must be interpreted as sheer ignorance or as a request for facts relevant for the purpose.

Let us now turn to references to related fields of knowledge that use the prestige of these fields to further an argument. References to "economic facts of life," "economic income," "socially desirable," "politically expedient," "fair share," "ethically reprehensible," "historically unsound," "psychology tells us," "anthropology indicates," "ideally included," "morally bound," "in terms of the engineering involved," "mathematically speaking," may go on without limit. In rare instances the prestige of the deity may be invoked to support our argument or to confound our opponents. The childish nature of many of these appeals to outside authority is apparent. Accountants may be swayed

---

[22] "Wisdom does not come to those who gape at nature with an empty head. Fruitful observation depends not as Bacon thought upon the absence of bias or anticipatory ideas, but rather on a logical multiplication of them so that having many possibilities in mind we are better prepared to direct our attention..." Morris R. Cohen, *op. cit.*, p. 17.

by the force of a seemingly settled and authoritative construct about which economists have been arguing for hundreds of years and have not yet reached agreement.

It is of course necessary for any field of study, such as accounting, to limit its scope of intensive effort and accept in a non-rigorous, more or less uncritical manner the pronouncements and disciplines of related fields. In this fashion the field of accounting joins law, economics, psychology, sociology, engineering, language, arithmetic and many other recognized areas. It is simply not feasible for accountants to examine these areas with sufficient care to become an expert in each. What is unfortunate is that accountants sometimes refer to these fields as if their problems were settled and more fundamental than those in accounting.[23] The general relationship of accounting to economics, for example, must certainly be admitted, but this admission does not commit us to accept or permit us to use uncritically such terms as 'economic value,' 'economically speaking,' etc., unless the economists have agreed among themselves on the points to which reference is made. There are many points about which economists are in substantial agreement, but exceptions are numerous and cover practically all important areas.

In conclusion consider for a moment the use of 'arbitrary' in the field of accounting. Many of the endless allocations made by some cost accountants are considered to be entirely arbitrary by economists and businessmen and are even called "arbitrary" by accountants themselves. If such allocations are arbitrary in the strict sense of being meaningless and completely without purpose so that there are no constraints on the allocator whatever, then there is not much left of this part of the profession. Certainly accountants have some purpose or objectives in doing the things they do in fact do. If not, there is no profession at all! If anything at all is acceptable (within the possibility set), then by definition the allocation is irrelevant, serves no useful purpose, and should be abandoned immediately by those with professional pretensions. Those with a warm feeling for the profession prefer to use the alternative term 'conventional' and to limit the use of both to those cases where there is lack of knowledge or genuine doubt as to the facts or the objectives. If, for example, an accountant has no judgment whatever about the life or value of a property, he may follow a convention of writing it off sooner rather than later. This convention may be out of step with current pressures and objectives, ~~and~~ o~~bjectives~~, but its adoption should not have been arbitrary and its purposes should be plain enough to constrain decision in some directions if not to channel it.

---

[23] We should not let ourselves be compared "...to those romantic souls who cherish the persistent illusion that by some new trick of method the social sciences can readily be put on a par with the physical sciences with regard to definiteness and universal demonstrability." Morris R. Cohen, op. cit., p. 350.

SOME PROBLEMS OF DISCLOSURE *

The conclusions expressed in this paper are relatively simple and obvious although the means of reaching them may seem to be complex and ponderous. First, it should be clear that there cannot be anything that closely resembles full disclosure in any precise sense. Accountants even with the help of expected future developments in computers simply cannot record and report everything everybody would like to know about a business, including profit or loss from specific past decisions or profits that might have been made if various alternatives had been taken. Severe abstraction and selection is therefore necessary. One then must ask: how is the selection to be made? Whose needs shall be considered most worthy and given priority? What are the criteria for selection? It is the contention of this paper that a relativist position is the only possible one in accounting or any other discipline that is subject to change that all procedures, methods, and disclosures must be judged by their ability to satisfy objectives; that such objectives may and do change and that they are socially determined in the sense that social forces decide who is worthy of information from accounting or other information systems. It is the contention of this paper finally that the success or failure of a profession depends on its being able to appraise objectives, place them into an order relation (hierarchy) with respect to worthiness, and to devise rules for satisfying them in approximate order.[1]

---

*Additional comments with regard to comparative strength of various types of disclosure are given in the essay: Accounting - A System of Measurement Rules.

[1] The relativist approach is not above criticism. Even a relativist must accept the existence of such entities as objectives, individuals to judge, criteria for ordering, etc. The chief advantage of a pragmatic approach is that arguments are not decided on irrelevant and unimportant grounds. For example, cost or market should not be rejected because it is inconsistent with some vague unimportant goal but should be judged on its ability or inability to accomplish its objectives; depreciation for hospitals cannot be defended by showing that depreciation is useful in a shoe repair shop. The search for generality and universal applications is commendable, but uniformity of this kind is only one objective. Uniformity is an important objective when comparisons are to be made and where ease of learning or understanding is important. In a given situation the objective of unrestrained uniformity may be unimportant, and attempts to attain such an objective may interfere with more important goals.

Recently the terms 'accountability' and 'stewardship' have been showing up in the journals more and more frequently. These terms are excellent ones for they tend to focus attention on assigning responsibilities for accomplishing objectives, recording facts and judgments relative to the achievement of objectives and preparing progress reports to those who have a worthy stake in the accomplishment of the stewards. It is equally important to understand clearly what magic these words cannot perform. Stewardship implies responsibility, but it implies nothing as to the nature of the responsibilities or what form the reports should take. Accountability too has pleasant connotations -- at least to accountants -- but the label does not answer the questions: accountability to whom? Or accountability for what? A discussion of these words is included because they may be useful in setting up a framework for a discussion of reporting and disclosure, and because -- on the negative side -- they are sometimes utilized in an improper way by certain current writers to defend the doctrine of original cost. Let us consider the possibilities for using stewardship and accountability as defenses for reporting on the basis of original cost.

The reader may wish to speculate on the possible forms of reports and types of disclosure if the accountabilities are in the nature of progress reports for the following commissions: Convert to cash as soon as possible without regard to loss: Leave a stronger concern that was given to you: Become the dominant concern: Drive competitors out of business: Lap the course at more than 200 miles per hour. (Perhaps the most famous example of unadulterated ambiguity in our culture is given in the parable of talents. Our sympathies may be with those who guessed wrong.) Accountants are asked to disclose progress toward all sorts of objectives, but usually the goals are stipulated.

Even a quick look at these charges indicates that original cost is not implied by any of the commissions and we conclude that such an inference is valid only when the responsibilities themselves are expressed in terms of original cost. The charge to preserve the assets (furniture storage, wine stewards, goldsmiths) can be accounted for in terms of physical units of wine, jewels, chairs, etc. The charge to increase the assets may be accounted for in terms of increase in the physical units, and, if a common denominator is needed, current values may be more useful than some scale based on original or aboriginal cost.

It should be clear that our problem is related to objectives in such a way that the extent of the disclosure, the content of the disclosure and the recipients of the disclosure cannot be determined until the social objectives are known. Unfortunately in a mixed economy the objectives are sometimes not clear and those who have legitimate interests in the results have widely diversified interests. The unmodified profit motive -- while still dominant -- is supplemented by a myriad of motives, non-profit considerations, and threads of public control. One of the interesting historical development of the past hundred years or so is the tremendous increase in the number of people who have a stake in the development of business and government enterprises and who are now important enough to support demands for information. Only remnants of the frontier remain so that the welfare and activities of countless business enterprises are of direct concern to all. Consumers in addition to owners and

creditors are therefore interested in the output of accounting and other business information services. Seniority and other rights have tended to increase the identification of workers with specific firms and industries, and their welfare is directly related to the welfare of their organizations. The public is now conditioned to limitations on the privileges that go along with private ownership of property and insist that its agencies (usually in the form of governmental agencies or units) regulate, tax, and otherwise police economic activity. Such activities obviously require information reports, and it does not follow that all require identical information. With the tremendous increase in types of creditor and ownership relationships and widely diversified state requirements, reporting to owners is not always as simple as non-accountants might assume.

Not only are the groups interested in economic activity now more numerous, but their relative bargaining strength in the market for information changes quickly and drastically. Within the lifetime of most professors of accounting textbook emphasis has shifted from the viewpoint of bankers and credit men to stewardship reports appropriate for absentee owners and then in turn to a more direct relation to the needs of internal management. Those who teach and practice accounting have awakened to the obvious fact that managers make decisions and that these decisions are sometimes aided by records of past facts and by a systematic combination of such facts with future expectations. Accountants have also discovered that labor leaders also need information, and perhaps our current managerial accounting textbooks will be replaced with even more modern laboristic accounting texts whose authors solemnly assert that the needs of labor are now dominant. In a specified environment and at a particular stage of historical development is must be possible to order the needs of various groups and develop an information service appropriate for these needs. It may even be desirable for courses and textbooks to specialize and stress information most often used by different groups. But in addition the profession must have devices for appraising the changes taking place and for integrating the shifting informational demands into a reasonably stable structure. The problem is complicated further by changes in the technology for data processing.

We now turn to the question of who in our society makes decisions about disclosure. Potential embezzlers are certainly interested in any deficiencies that might exist in the devices for internal control. Others might appreciate and be willing to pay for information about combinations for the various safes, the whereabouts of the checkwriters, the kinds of locks on the warehouse doors, those employees who are least loyal to the organization and easiest to bribe. Some stock manipulators would no doubt relish and encourage the presentation of erroneous reports to stockholders, potential stockholders, and others.

A recent study by Alan Cerf, of the University of California, indicated that public accountants tend to feel that the responsibility for disclosure rests primarily on management.[2] Perhaps by implication

---

[2] Alan Cerf, Unpublished research at the University of California, Berkeley.

opinions on managements' representations exclude the need for further opinion as to whether sufficient information is given! To adopt such an irresponsible attitude is to invite trouble for the accounting profession. (Traditionally, of course, some provision for the scope of the opinion is implied by the custom of including both an income report and a financial status report.) It is the contention of this paper that society has placed far too much third-party responsibility on the public accounting profession to be discharged in such a slipshod manner by what amounts to implicit definitions of the scope of the opinion.[3]

The reasons for not permitting management to decide what information must be disclosed are precisely those reasons why public accounting itself came into existence. The general feeling that outsiders such as creditors, insurance firms, owners and others have enough stake in the future of a business to support a request for dependable information prepared by those without direct interest in the effects of the information is, of course, the attitude that led originally to the profession of public accounting. It was recognized that those who manage businesses are among those most strongly motivated by the acquisitive instinct and may therefore be tempted to color the statements. The development of a professional group whose members are able to appraise the needs of outside groups, to rank these needs according to some scale of worthiness set forth by the customs and laws of the prevailing social order, and to report without coloration was probably inevitable. Nevertheless, there has been considerable evidence that law makers and others who represent the general desires of society have been impatient with the rate of growth of a professional attitude among accountants. Prescribed systems of accounts and reports go back at least to 1906. Unlike its British cousins the Internal Revenue Service finds it desirable to employ its own accountants. Viewed from a broad base, the Securities Act and Securities and Exchange Act represent the most dramatic vote of non-confidence ever given to the accounting profession. New laws usually arise because there is dissatisfaction with the status quo. The dissatisfaction with corporate reporting must have been great indeed.[4]

---

[3] Even the implications of changes in the names of statements may be important. The neutral title "balance sheet" apparently makes few it any implied representations other than the statement is a sheet and sometimes balances. The title "statement of financial condition" may make some implied representations that our present reports do not begin to fulfill.

[4] There is evidence of dissatisfaction with the inflexibility of many other professions -- perhaps all professions. Dissatisfaction may of course be reflected without new legislation and regulatory commissions. When a group or institution no longer satisfies its objectives, new institutions tend to arise. Certainly the fact that operations research men are so numerous and prominent in business may be interpreted as evidence of some dissatisfaction with the products of cost accounting. There are numerous specific instances such as the steel executive who found it easier to start a new cost analysis division than to reeducate his hide-bound, cost accounting department.

It may be less irritating to interpret such regulatory legislation as an aid for a struggling profession which at the time is too weak to impose its will on businessmen and make its orders stick. At any rate, it seems clear that certified public accountants are afforded by society for the specific purpose of insuring reliable and adequate stewardship reports. What shall be disclosed is not a decision that is best left for those who directly stand to gain or lose by suppressing information or giving misinformation. Certified public accountants as a profession must insist that disclosures be made. If they react to social desires too slowly, their profession will be aided (coerced) by legislation and other sanctions, or what is far worse, the profession may cease to be considered an independent profession and be abandoned as a group of special-interest pleaders (advocates) for the insiders. In the latter event, a new group -- perhaps with government direction and control -- will arise and will assume the functions of independence that society feels is so vital for its operation.

It is comforting to hold that the laws and other coercive devices are put there directly to force management to report correctly. Unfortunately this interpretation leads to difficulties, for it leaves little or no place for a profession of public accounting. This interpretation implies that someone must insist that managers conform to the requirements for reporting. This someone could be a public accountant, but he could just as well be a clerk in a government agency. We have experienced this kind of operation in some regulated industries, and accountants are not alone in disliking what they saw. It must be concluded therefore that the public accounting profession has the direct responsibility for insisting on disclosure of material information. It must be concluded also that the profession insists on matters determined to a large extent by the political and social leaders who decide what the desires and requirements of society appear to be. Yet as an independent profession, accountants have further responsibilities. Accountants are in a position to know the difficulties in measuring and reporting business data and judgments. It follows that the profession can perform an important service by explaining to the law makers and social leaders in a relatively unbiased manner the problems involved in requiring certain types of disclosures. In a similar fashion the profession can be of direct service to managers by explaining the necessity for disclosure and the importance of disclosure to those who are responsible for the overall operation of the economic system. Thus, the profession takes on an important educational program in both directions, and it is desirable that educational programs be undertaken in the environment of an independent, unbiased profession. Certainly an independent institution that influences people to understand is superior to one that makes use of force and coercion.

The problems of disclosure are closely related to problems of communication generally. Communication channels themselves tend to become stabilized so that interested parties often get their information from the same sources in terms of the same cues and symbols and with the same bias or slant. It is widely known that information going to those above (with some degree of dominion) tends to be slanted toward the interests of those reporting. Unless alternative channels are available so that mis-information will be discovered more or less automatically by those above,

there will be a tendency to suppress unfavorable facts and judgments. Thus accountants must be aware of the probability of slanted reports and the for-interest, against-interest direction of the probable slanting. Management reports to their superiors -- owners, creditors, regulatory agencies -- may have a considerable different "stress" from those addressed to lower levels of management and non-management groups. Moreover, the slanting may vary from time to time to correlate with changes in desired reactions from those above. Occasionally the reactions tend to conflict, e.g., higher desired reported earnings to indicate effective administration combined with the desire for lower earnings to lessen pressure for dividends, wage increases and taxes.

Slanting is made possible by the varying shades of meaning commonly attached to language symbols and by the abstraction process in reporting the "facts" -- the consequences of accounting events - and facts are themselves inferences. The following remarks apply also to the auditing function.

> ...the recipient of a communication is severly limited in his ability to judge its correctness. Although there may be various tests of apparent validity, internal consistency, and consistency with other communications, the recipient must, by and large, repose his confidence in the editing process that has taken place, and, if he accepts the communication at all, accept it pretty much as it stands. To the extent that he can interpret it, his interpretation must be based primarily on his confidence in the source and his knowledge of the biases to which the source is subject, rather than on a direct examination of the evidence.[5]

The entire process of communication is a process of abstraction, and selection processes usually have been applied at many points before reports reach their destination. It is this feature that permits broad views that otherwise could not be comprehended, but it is precisely this feature that makes slanting feasible and difficult to detect.[6]

---

[5] James G. March and Herbert A. Simon, *Organizations* (New York: John Wiley & Sons, Inc., 1958), p. 165. These writers also emphasize the limitations of the "language" so that some concepts can be communicated with great difficulty. Psychologists have long been aware of the tendency for messages to take on added connotations and overtones as they go down the line of authority. They tend to have reduced overtones as they go up the line.

[6] Our knowledge of the world turns out to be a construct formed by selective experiences. "Facts" are thus reports of experiences that are subject to empirical verification. Simon and March emphasize the probable increase in confidence (relative to clues) as abstraction increases, but use evidence in a strange manner. "Uncertainty absorption takes place when inferences are drawn from a body of evidence and the inferences, instead of the evidence itself *sic* , are then communicated." *Ibid.*, p. 165.

The usual problems of abstraction and slanting are difficult enough, but matters are complicated further by the presence of "noisy" channels of communication. Noise (random disturbances) is the result of contamination from all sorts of interferences and constraints that lead to uncertainty about what the message intends to convey. The results are "equivocal." It has been estimated, for example, that the English language is as much as 50% redundant, and Brunswik has pointed out that proper coding might save one half the effort now required if we were assured of noiseless channels, but he concludes that some redundancy is necessary to help overcome some of the effects of unavoidable noise.[7]

Accountants are subject to a certain amount of fuzziness in making their interpretations of events, in evaluating the magnitude of resulting changes, in translating the interpretations into symbols (language) and in condensing and transmitting the reports. The transmission channels introduce further interference. Yet a major source of trouble still remains: the reactions of those who decode the communication, interpret the results in terms of objectives, and incorporate them in their decision-making processes. While positivists, and perhaps others, have been cautious about the lack of precision and the psychological implications of the term 'meaning,' it is clear that accountants must meet the problem squarely. In fact, the purpose of communication is oriented toward the user, and its effectiveness is measured (at least in part) by its ability to evoke desirable responses. Accounting argument therefore must begin with the objectives and proceed backward. An important intermediate step is, of course, to explore the possibilities for educating the receivers -- teaching them to decode and interpret the message more effectively. Unfortunately we have only begun to enumerate needs and specify users. The finer points must wait until more groundwork is completed.

Some preliminary groundwork has been done sponsored by The Controllership Foundation. Simon, Kozmetsky and Tyndall have attempted to classify the uses to which accounting data are put. They isolate: (a) problem-solving questions which ask which course of action is appropriate to obtain objectives. (b) attention-getting questions which bombard the user with information that suggests which problems should be investigated; score-card questions which indicate extent of goal ac-

---

[7] Egon Brunswik, "The Conceptual Framework of Psychology," *International Encyclopedia of Unified Science* (Chicago: University of Chicago Press, 1955), p. 750. Brunswik relates psychological reactions to noisy communication channels. "...perceptual cues and behavioral means are like 'signals' in 'coded messages.' The perceived objects and behavioral results which correspond to the message are mediated through 'noisy channels.' These latter are contaminated with interferences or constraints of their own....the crux of organismic adjustment obviously lies in the fact that distal perceptual and behavioral mediation must by the nature of things...rely on overloaded channels, with the ensuing limited dependability." *Ibid.*, pp. 748-749.

complishment.[8] March and Simon have suggested the possibility of substituting "coordination by plan for coordination by feedback."[9] Accountants have given considerable attention to this important aspect of their work. Some bumbling distinctions have been made between planning and control (a poor opposition!) but a serious attempt has been made integrate budget plans with historical records and to report exceptions to the plan. In fact, this is the basis for variance reporting in standard costing. Additional work can be done in the area of automatic responses to variance feedback, and almost no work has been done with the possibilities of integrating plans with feedback at the level of reporting to investors and owners. Perhaps management should report its budget expectations and deviations to owners. Scattered clues, such as unfilled orders and union demands could be replaced with summary budget estimates. Economists have long made a sharp distinction between planned income and windfall profit, and have sometimes assumed that only plans are conduct determining. Clearly reported windfalls (favorable and unfavorable) are integrated into future plans. Thus we might argue that it is only the feedback of deviations from plans that lead to new strategies and are conduct determining. One might compare the original plans (as part of the environment) to sunk costs and argue that it is only the feedback of exceptions that leads to interesting, non-programmed, non-routine actions.

The interesting part of the above discussion is that accountants have been doing precisely what its critics contend should be done. Accountants do measure progress toward objectives, compare progress with plans, and report variations to those with authority to amend plans or to force compliance. Our feedback of variances may be too slow or our scope may be too narrow in that owners and other outside groups are often neglected. But even here a start has been made. A slight extension of governmental accounting techniques would provide for variations in sales volume and sales prices from plans, and incorporate a full retinue of variances in published reports. Profit-charts (breakeven charts) may provide an intermediate step without bringing about a serious break with tradition. Some accountants now present such reports, and a more general expansion to include plans, accomplishment and major deviations is a relatively minor technical job. The added disclosure can hardly avoid leading to major improvement in plans and decisions.

---

[8] H. A. Simon, G. Kozmetsky and G. Tyndall, Centralization vs Decentralization in Organizing the Controller's Department (New York: The Controllership Foundation, 1954). Simon and March have prepared a more general list:

"1. Communication for nonprogrammed activity....
2. Communication to initiate and establish programs, including day-to-day adjustment 'coordination' or of programs.
3. Communication to provide data for application of strategic (i.e., required for the execution of programs).
4. Communication to evoke program (i.e., communication that serve as 'stimuli').
5. Communication to provide information on the results of activities." Op. cit., p. 161.

[9] Op. cit., p. 162.

At the practical level accountants have devised some techniques to vary intensity of disclosure. The reporting field is divided into a core of information that has wide application and general usefulness and a periphery of information that is needed only occasionally. Core information is collected and reported as the routine output of the accounting system. Other information is collected and reported on an intermittent basis as the specific needs arise. Not enough study has been devoted to this problem of classification, and many misunderstandings have arisen. Interest on investment (normal return), for example, may be included as a systematic expense, but most accountants prefer to treat the comparison of normal and actual as a special study. Incremental costs from a shifting environmental baseline may be incorporated in the routine accounts and reports, but most accountants have preferred to smooth irregular costs and compute unit costs from a zero base with incremental costs prepared as supplementary reports. (Advocates of direct costing wish to reverse the process by showing product costs on a marginal basis and full costs on an intermittent basis.)

A slightly refined approach makes use of a more detailed classification in the form of "layers of urgency." There is of course no fundamental basis for distinguish layers, and a substitution involving levels of authority has sometimes been made. A general rule that calls for reporting at each level only those items that are controllable at or below the level is commonly used. In addition accountants must "read the water" of information needs for outside groups. For investors net income figures are considered to be more urgent than individual expense items. Percentages are rated below the amounts. Current assets and obligations are given the dominant positions in a condition statement.

The use of supplementary devices for disclosure permit a fairly rigid uniform system of fundamental reporting with the obvious advantages of uniformity. Uniform systems and reports have a tremendous social advantage due to the ease and simplicity of operating and interpreting them. Such advantages permit the application of rigid rules that can be learned by personnel with fairly low-level intellects, and if for some reason it is necessary to change personnel, the use of uniform procedures involves less social cost for training and wrong decisions based on misinformation. Investors and members of the Securities and Exchange Commission are well aware of the difficulties of comparing reports for different organizations. Generally accepted accounting principles permit such choices as LIFO or FIFO, diminishing balance or increasing charge depreciation, capitalizing or expensing intangible costs of certain kinds. The advantages of uniformity are manifest, but the solution is not necessarily enforced uniformity or the inflexibility of an accounting court.

The chief advantage of supplementary disclosures is that they preserve uniformity in a large segment of the field yet provide an acceptable degree of flexibility. The savings in social cost is in the form of better decisions with less error in the allocating and combining of resources. The question of disclosure is unavoidably mixed up with the cost of getting and measuring information. Disclosure costs are normally unimportant.

A part of the cost of failure to disclose useful information takes the form of loss of confidence in the information-control system and a downgrading of its output. The problem of cost is also complicated by the needs of the various groups interested in the organization. It may be of benefit to the insiders to give no reports or to give false or misleading reports to outsiders. It is equally clear that not all information needed by each level of internal management is useful enough to merit disclosure to widely scattered creditors and stockholders. Disclosures of this kind can be thought of as a disservice to insiders and a service to outsiders -- a kind of transfer of benefit. Yet this kind of disclosure can be expected to improve the performance of outside groups in allocating resources and combining them, and such disclosure should not hinder the allocating and combining of internal resources by internal managers when judged from the overall viewpoint of society. In a similar manner disclosure of failures of the internal control system and the flow of resources to non-organizational ends is a transfer of benefit to owners, taxing authorities, etc., and a disservice to those who are misappropriating resources. Information to the wrong levels of authority or a general excess of information can do more harm than good by adding to the confusion and mixing lines of authority. A similar issue arises when there is a possibility of giving too strong a disclosure (relatively) than the information merits. The cost of showing relatively insignificant data in a dominant position is due in part to the necessity for showing more important information in an alternative inferior position where it is overlooked or misinterpreted.

Some Current Sore Spots

Investors are interested primarily in future fund flows to them, and disclosure is or is not important to the degree that it is helpful for judging future prospects for funds. The output of several types of information services is available to investors and among them are those offered by the accounting profession. In a sense the results of accounting operations are concerned largely but not exclusively with past results. In this aspect accounting reports are similar to those found in the Racing Form, batting and earned-run averages, football scores and other compilations of past performances. While such reports may have some value as momentoes and for inclusion in a scrap book, their primary value is for predicting the future, and their usefulness must be judged from this direction. Any standard of good disclosure, therefore, must be related to an index of usefulness for future decision.

For the purposes of the present discussion current sore spots are divided into the following groups:

1. Those that result from asset definitions.
2. Those that result from poor matching of costs with revenues -- or valuation.
3. Those that result from realization problems -- liquidity problems.

4. Those that result from definition of liabilities.
5. Problems of stockholders' interests.
6. Those that result from failure to report future policies and intentions -- problems of the "outlook."

Let us turn now to some of the more obvious problems that stem from asset definitions. First, accountants have failed to assign asset values to some extremely valuable considerations. The difficulty is compounded in many cases by a stubborn attachment for valuation at original cost in the face of overwhelming evidence that such costs are hopelessly out of touch with any valuations or sacrifices that might have relevance to current decisions. Consider the problem of oil reserves. Are they important? If so, to whom? How can disclosure be given? Is extraction expensive and difficult? Whether extraction is expensive or inexpensive the most obvious and direct disclosure is to present the estimated value of reserves. Is a footnote that gives the amount of reserves in physical units without giving expected cost of extraction . adequate? Should the fact that the concern is reducing its reported profit by purchasing crude for its refineries instead of using its own low-cost reserves be disclosed? Should shifts in the mixture of purchased and owned crude be noted? If accounting statements are to be taken seriously, a strong affirmative answer is required.

What shall we do about a particularly brilliant president who may be expected to stay with us for several years and yield an economic rent far in excess of his salary? What about the good morale of the working force? An outstanding and underpaid sales manager? The senility of officers in rival concerns?

It may be argued that these valuable considerations will be reflected ultimately in the income reports. Indeed they will, and so will the benefits from buildings, machines, inventories and many other things that are called assets. But how long can the reader expect these benefits to persist? At least he can check building depreciation and replacement from the reports and reach some tentative decisions, but how is he to appraise the expected life of contributions that accountants refuse to admit as assets or even report? What then do figures on interim balance sheets mean and what is their purpose?

An interesting current example of our difficulties in asset definition arises in connection with a net operating loss carryover. Should one treat the carryover as an asset and reduce the reported loss by approximately one-half? Is the right to make the carryover valuable? Is it probable? We cannot be sure (positive) that the firm can use the benefit, but one cannot be certain of any expected benefit (asset). To delay recognition until accountants are certain is a universal argument for doing nothing.

Further difficulties in reporting stem from failure to match costs with revenues in proportion to benefits received and to be received. In part this difficulty is due to our failure to estimate the future correctly -- a failing that is not peculiar to the accounting profession -- but in part it is due to a resigned and hopeless attitude combined with

pressure for immediate short-term tax savings. Currently this problem is at its worst in the area of research costs. The difficulty is well illustrated by many business games that have been so popular in American universities. Team A spends relatively large sums on research and development and charges such expenditures against revenues so that past reported profits are relatively poor. Team B, on the other hand, authorizes meager research expenditures especially during the later years of play. Profits were relatively high. At the end of the game a controversy arises: who has won? The team with the better reported profits had the poorer prospects, and the team with the poorer past record had the better prospects. The analyst who attempted to judge the future from accounting records of the past and the latest balance sheets is sadly misled. A part of the strategy of the game is to anticipate peculiarities in the reporting service!

In a competitive environment a certain amount of fruitful research must be carried on more or less continuously in order to keep abreast of competition, maintain a suitable environment, and permit the firm to operate with a chance for profits, and thereby justify the going concern values attributed to other assets. For this reason and because of the recurring nature of the expenditures accountants have tended to expense such expenditures immediately as ordinary revenue expenditures necessary to maintain a competitive organization and protect the investment. This approach is clearly related to the replacement method of depreciation, and represents a workable set of expiration rules if such expenditures are relatively small. In many of the growth industries of today disbursements for research are so large that a more careful appraisal of the expected benefits must be undertaken. Undoubtedly many such firms possess valuable layers of hidden fat that are not indicated on the statements of financial condition. The problem is difficult without question, but there is no excuse for the widespread uncritical attitude toward such important items as patents, trademarks, copyrights, secret formulas and other fruits of successful research.

The depreciation problem offers similar difficulties. As a standard we usually accept the writeoff of cost in proportion to benefits expired to total benefits expected. Under stresses resulting from high tax rates, fear of missing under the allowed and allowable provisions, desire to show immediate tax saving to clients, a general heritage of conservatism, and perhaps for interest considerations accountants have sometimes permitted the carrying of substantial service potential without corresponding value on the statements of financial condition. In this situation there may be, however, ameliorating factors that result from increases in replacement costs and, until recently, a stubborn adherence to straightline even though many assets yield larger services in early years.

In summary, the reader of financial statements may search earnestly and long for answers to questions such as these: How long will the low original cost depreciation continue to effect future profits before higher replacement depreciation catches up? How much of the reported past profits are due to low original-cost depreciation? How much valuable existing property has already been written off against past revenues? How much longer can our basic patents be expected to

operate? To what extent have original cost figures lost all contact with current values? The future may indeed be so obscure that little improvement in disclosure of such matters may be expected. This paper asks only that the accounting profession reconsider its procedures and attitudes with the care the problems so clearly deserve.

A further group of disclosure problem have resulted from adherence by the accounting profession to the concept of realization and of original cost. Realization is often connected with the problem of evidence. In fact, realization is so intimately connected with evidence, and evidence in turn is so intimately connected with sale that many accountants identify realization with the sales event. Traditionally accountants have been concerned with problems of liquidity and working capital management. With the support of banking groups, they have built into their definition of income not only the requirement for value increases but also the requirement that the increases be in liquid form. There is of course considerable disagreement about the merits of such liquidity requirements, but if they are adopted and if we insist on carrying assets at original cost until realized, it is clear that a strong force is at work during a period of rising prices to bring about asset figures that are vastly undervalued. Fortunately there is an effective method of disclosure available in the form of appraisal techniques. Such techniques permit asset figures that are in line with current valuations to be reported without violating the liquidity requirement for income recognition. Moreover, the appraisal device has wide applications that have not been fully exploited. The most obvious extension to inventories is the LIFO basis. A manager who treats a given asset as a free good because it has been completely depreciated and combines it with other productive agents without regard to its current value squanders society's resources and is a poor manager indeed.

The accountant's approach to income has a more fundamental deficiency than those arising from liquidity considerations. They have identified a number of uses for reported income that include: guide to withdrawals, help in allocating resources, indicator of management's ability to estimate future conditions and combine factors effectively. Nevertheless accountants have not faced up to some elementary problems of periodic reporting. Should, for example, quarterly income reports be a reflection of what can be expected for the year? If so, should yearly income reports be smoothed and measured to provide an indicant of future years' prospects? Is a period's reported income a measure of the value added by shrewd decisions during the interval? How can the profession recognize the value added by able management period by period and still have the statements reflect long-run prospects? In other words, how much smoothing is desirable? With regard to these questions the profession's disclosure is obviously weak.

Important disclosure problems may also arise because of the traditional definition of liability. The usual definition of liability is in terms of legal obligation. Any dark clouds that have not jelled into legal debts are considered to be contingent liabilities, and the methods of disclosing contingent liabilities leave everything to be desired. They are atrocious! Some accountants have suggested that the definition of liability be broadened to include expected demand on funds. This pro-

posal has merit in that it should remind us to examine expected black clouds and recognize them, but it has the obvious disadvantage of mixing all kinds of adverse expectations in the same classification with more stable obligations. What if the probability is ten to one that the firm wins a law suit and has no obligation? Would disclosure rules be different if the probabilities were reversed? These problems are present regardless of the type of disclosure used. Accountants are faced with the problem of how to disclose possible adverse events with all kinds of probabilities. The problem is further complicated because there is not only difficulty with the probability itself, but the amount of the settlement is usually not known and must be estimated. Perhaps Bayesian statistics and expected values may prove to be helpful, but accountants have shown little disposition to use these concepts to define and measure either assets or liabilities.

Retained earnings restrictions inherited the antagonisms that were formerly directed at surplus reserves in general, but the reserve for contingencies has some genuine advantages as a disclosure device. It affords management an opportunity to warn outside parties of the possibility of unfavorable events without implying that the amounts shown are accurate or the events certain.

The Cerf study was designed to find out what additional information investors desire. The following were mentioned with some frequency, and it is interesting to note that with one or two exceptions disclosure of these items should not be difficult.

1. Disclosure of capital expenditures and expansion plans.
2. Information for fixed-variable cost breakdown.
3. General information on labor contracts and outlook.
4. Basis of consolidation of affiliated concerns.
5. Economic outlook and industry trends.
6. Tax clearances and general situation.
7. Expenditures and attitude on research and development.
8. Sales breakdowns and production prospects.
9. Information on reserves.
10. Directors and their affiliations.
11. Proven reserves.
12. Depreciation methods.
13. Inventory -- not just LIFO, but when did the firm adopt LIFO.
14. Extent of tax allocation.
15. Marketable securities at cost, market, or market after tax?

An interesting sidelight of the Cerf study and a previous study by Horngren[10] is that only 25 of 200 investments experts considered price-level adjustments important enough to require even pencil adjustments in the margins. Horngren speculated that this lack of interest is due to

---

[10] Charles T. Horngren, "Security Analysts and the Price Level," The Accounting Review, October, 1955, pp. 575-581. This is an interesting report on research in information needs.

their disposition to look at depreciation as current funds more or less independent of replacement decisions. Perhaps analysts make allowances for such changes in other ways. Perhaps they need education. Perhaps university professors have been making a big fuss over a relatively unimportant problem.

ACCOUNTING -- A SYSTEM OF MEASUREMENT RULES

"Written numeration is probably as old as private property. There is little doubt that it originated in man's desire to keep a record of his flocks and other goods."[1] In recent years it has been fashionable to identify the whole of accounting with measurement and to insist that accounting is a subdivision of the total field of measurement. This chapter contains comments on this view and contains also some general remarks on measurement and its meaning in the broader field of scientific method.

Accounting, as now constituted and practiced, is composed of a group of behavioral hypotheses, techniques for appraising and ranking need, and rules for classifying and measuring that are oriented toward fulfilling the responsibilities and objectives of the profession. The first task is, of course, to determine the needs to be filled. This task requires estimates of objectives, decisions, and information necessary for these needs. Once these preliminary tasks have been taken care of accounting leans heavily on the field of classification and measurement. This chapter then contains an elementary discussion of some classification and measurement aspects of the accounting profession.

Measurement in accounting is directed at achievement of objectives and is therefore a purposive series of operations and conventions. Thus the tests of effective measurement are the tests employed by instrumentalists everywhere -- the degree to which it satisfies the objectives compared with the sacrifice (cost) of attaining the satisfaction. The first task in appraising the measurement processes and rules is therefore identifying and weighing objectives and fitting the measurement rules to the resulting needs.[2]

---

[1] Tobias Dantzig, Number, The Language of Science (New York: The Macmillan Company, 1959), p. 21. The importance of measurement can hardly be overestimated. Alfred North Whitehead states: "...Aristotle by his Logic throws the emphasis on classification. The popularity of Aristotelian Logic retarded the advance of physical science throughout the Middle Ages. If only the schoolmen had measured instead of classifying..." Science and the Modern World (New York: The Macmillan Company, 1925), p. 41.

[2] This view is in harmony with that expressed by Russell L. Ackoff in The Design of Social Research (Chicago: University of Chicago Press, 1953), pp. 69-70. "...scientific quantification is a way of assigning numbers to properties, objects, and events so as to yield useful information....Thus 'efficiency in use' is the key to scientific quantification....Ideally the decision to qualify or quantify, and how to quantify

In part the eagerness of accountants to attach themselves to those who measure may be due to the esteem in which measurement is held in our scientifically-oriented society. Accountants, and it seems practically everybody else, have been fond of quoting over and over the alleged statement by Lord Kelvin that knowledge of non-measurable facts and relationships is in effect sheer ignorance. The benefits of measurement are almost self evident for they include the advantages to be derived from a large part of mathematics, but a substantial portion of modern mathematics (e.g., topology, axiomatic systems) need not utilize measurement in the traditional sense, a development that has led Lord Russell to comment:

> ...the laws of macroscopic physics are topological laws, and...the introduction of number through co-ordinates is only a practical convenience, the laws being such as can, in theory, be expressed without the use of number. The old view that measurement is of the essence of science would therefore seem to be erroneous.[3]

The rigor necessary to identify and bound problems so that they may be subjected to the rules of measurement often has a vitalizing and healthful effect on a profession. Accounting is composed of numerous measurement rules (both implicit and explicit), but unfortunately the applicability of the rules to varying needs has received far too little study and intellectual effort. Let us turn to the operations necessary to carry on measurement and to a brief discussion of some of the more obvious accounting measurement rules.

A discussion of the nature of measurement begins with the ability to discriminate the rules for determining membership or non-membership of a class (qualitative classification), and moves to the things that have to be done to establish a one-one correlation of the classes with some subset of the real number system (scaling).

In the simplest terms: "Measurement is the general procedure of assigning numbers to the properties of objects."[4] The most primitive

---

or qualify, should be based on a systematic comparison of costs." The view expressed is opposed to that of William J. Vatter, "Contributions of Accounting to Measurement in Management," *Management Science*, October, 1958. "The central problem in any measurement process is the selection of the measuring unit." p. 28. In most cases the selection of the unit in conventional (arbitrary) and of minor importance.

[3] Bertrand Russell, "On the Importance of Logical Form," *International Encyclopedia of Unified Science* (Chicago: University of Chicago Press, 1955) p. 41. A similar view is expressed by William J. Goode and Paul K. Hatt "...the most 'qualitative' of social research attempts rough measurement....the increasing use of statistics is not the distinguishing feature of modern social research. Rather, it is the increasing precision and reliability of research techniques, and higher standards of proof..." *Methods in Social Research* (New York: McGraw-Hill Book Company, Inc., 1952), p. 314.

[4] Victor F. Lenzen, "Procedures of Empirical Science," *International*

operation necessary for classification or indeed for modern scientific method is the operation necessary for discrimination, i.e., finding whether or not a particular object or property does or does not belong to a specified set. This primitive operation requires the subject to be able to distinguish the required property from all other types of properties and to be able to reach a decision as to whether or not the property is present. In a slightly less primitive form the subject finds it necessary to pass judgment on similarity in the sense that the properties of two sets can be matched as to their presence or absence and, even less primitive, put in a one-to-one correlation with one another and remainders noted.[5]

So far we have not considered what is necessary for inclusion as a member of the class "property." The definition of Lenzen is a classic: "The properties of things are modes of reaction to conditions that are subject to experimental control."[6] It is clear that we cannot observe and manipulate the whole of experience, and that science must isolate in some way the area under consideration -- isolate the conditions that can be used in hypothesis and controlled for experiment. Torgerson makes use of the term "systems" to indicate a set or collection of properties.

> Whenever we define or denote a property, it always seems to be a property *of* something. For this something, we use the term *system*. Thus, properties....occur as aspects or characteristics of systems. To make the circle complete, we might define a particular system as roughly that which possesses such and so properties.[7]

Encyclopedia of Unified Science, *op. cit.*, p. 289. Essentially the same definition is given by S. S. Stevens: "...measurement...is...the assignment of numerals to objects or events according to rules." "On the Theory of Scales of Measurement," *Science*, June 7, 1946, p. 677. Bertrand Russell defines it as follows: "Measurement of magnitudes is, in its most general sense, any method by which a unique and reciprocal correspondence is established between all or some of the magnitudes of a kind and all or some of the numbers...." *The Principles of Mathematics* (New York: W.W. Norton & Company, Inc., 1938), p. 176.

[5] It is interesting to note that some textbooks on modern mathematics require only that a set be subject to unambiguous methods for determining inclusion or exclusion. Many exercises then are of the type: "Do the red-headed male residents of Chicago form a class?" Presumably the problem is to find whether or not the rule for inclusion is unambiguous. These exercises may be useful but unfortunately, they are not mathematics. These problems require further rules of correspondence for determining empirically (in fact) who is or is not to be included. Psychology, scientific method, physics of optics, legal definitions of "resident," and all kinds of non-mathematical considerations are necessary to answer this question.

[6] Victor F. Lenzen, *op. cit.*, p. 293.

[7] Warren S. Torgerson, *Theory and Methods of Scaling* (New York:

With Torgerson's expressed belief that there is a distinction between a system and a property, it is difficult for him to agree with the Steven's approach to measurement as rules for assigning numbers to events or objects. His statement therefore is extremely critical.

> Stevens' definition...does not mention property. For him, if numerals are assigned to objects according to rules (presumably any rules), we have measurement. And apparently it is the object that is measured and not...a property of the object....According to this view, we have measured or scaled a stick, though only at a primitive, nominal level, when we determine that that particular stick is a "two." Thus, for this approach, classification, and even naming of individual instances, becomes a kind of measurement.[8]

Stevens would insist that the assignment of numbers to football players is a kind of measurement -- a nominal measurement. With the usual rules for assigning numbers that try to identify players and also their positions by blocks of numbers, we could have a nominal measurement, but presumably if letters were used to accomplish the same ends we would not have measurement. Thus numbered accounts would result in measurement while mnemonic or lettered accounts would not qualify.[9]

While it may seem that there is much ado about nothing in this area, there are several reasons why we may wish to adopt the approach to measurement that Stevens recommends. Certainly the distinction between qualitative and quantitative tends to diminish. It has already been pointed out that modern mathematics is becoming less and less concerned with the usual quantitative aspects of numbers and more concerned with

---

John Wiley and Sons, Inc., 1958), p. 9. The admitted circularity is, of course, completely unnecessary, and results in part from Torgerson's approach to the definition of property. "Properties are essentially the observable aspects or characteristics of the empirical world."(p. 9) He is correct in pointing out that a book is a system construct while weight and thickness are property constructs. Carnap takes a somewhat different view and feels that the distinction should be made according to the type of predicate involved. "A one-place predicate designates a property. (E.g. 'Book designates the property of being a book; 'Blue' designates the colour blue, a property of certain things.) We shall call this property the *intension* of the predicate." Rudolf Carnap, *Introduction to Symbolic Logic and Its Applications* (New York: Dover Publications, Inc., 1958) p. 40.

[8] Warren S. Torgerson, *op. cit.*, p. 14.

[9] Torgerson is unrelenting: "His [Stevens'] nominal scale refers to the processes of...classification, with the trivial restriction that numbers be used to name the objects or name the classes of objects." *Ibid.*, p. 17.

ordering and relations. Thus it no longer true that a branch of empirical learning must be directly related to numbers in order to enlist help from the field of rigorous mathematics. For example, functional relations no longer need be related to number, and even the familiar greater-than, less-than may sometimes be replaced by other relations such as dominance, ancestor of, etc.

Most accountants will probably agree that the assignment of numbers to identify classes is a trivial distinction to be used as the defining characteristic of measurement, but calling 'classification' 'measurement' may serve to emphasize the importance of classification. Certainly Stevens himself, has been one of the most effective advocates of classification and its presupposition of the ability to discriminate.

> When we attempt to reduce complex operations to simpler and simpler ones, we find in the end that discrimination, or differential response is the fundamental operation. Discrimination is prerequisite even to the operation of denoting or "pointing to", because whenever two people reduce their complex operations for the purpose of reaching agreement or understanding, they find that unless they can each discriminate the same simple objects or read the same scales they still will not agree. Agreement is usually reached in practice before these most elementary operations are appealed to.[10]

Torgerson has admitted that classification, when done finely enough, is subject to the procedures of measurement.

> Given that a property is measurable (this is not necessarily true of all properties), the advantages of defining it in terms of measurement, as contrasted with a purely classificatory definition, accrue both in the descriptive and in the explanatory functions of science. In terms of description, it makes for greater descriptive flexibility, since the number of classes is theoretically unlimited....In terms of explanation, it allows for more precise formulation of general laws relating different constructs, and it enables the paraphernalia of mathematics to be extensively applied to science....Theories and laws can be formulated in terms of mathematical equations.[11]

---

[10] S. S. Stevens, "Psychology and the Science of Science," Psychological Bulletin, 36 (1939), reprinted in Readings in Philosophy of Science, ed. Philip P. Wiener (New York: Charles Scribner's Sons, 1953), p. 164. "We combine operations when they satisfy the criteria of a class; and the concept of that class is defined by the operations which determine inclusion within the class." (p. 168).

[11] Warren S. Torgerson, op. cit., pp. 11-12. Many will not admit that "unmeasurable" properties exist. Torgerson's definition of measurement keeps his use of non-measurable properties from being ridiculous.

The characteristic of measurement, aside from the nominal measurement of Stevens, is that some characteristic (property) that can be separated from its environment and specified can be put in a one-to-one correspondence with the real number system, or some subset of it, or some other set of symbols with specifiable distances between them. If such a relationship can be established generally, i.e., the behavior of the property is isophomorphic with the subset of numbers, the operations of mathematics may be applied to the numbers assigned to the property and new configurations can be derived. Unfortunately, it is seldom possible to have such a general isomorphic relationship, and the measurement scales are usually limited in that only some of the mathematical weapons may be applied. Let us turn now to some of the "scales" that may be identified in various measurement systems. Torgerson points out some of the characteristics of the real number system that are relevant to measurement and can be used for a basis of classifying measuring rules.

> "1. Numbers are ordered.
>
> 2. Differences between numbers are ordered. That is, the difference between any pair of numbers is greater than, equal to, or less than the difference between any other pair of numbers.
>
> 3. The series has a unique origin indicated by the number "zero." An important feature of this origin is that the difference between any pair of numbers containing zero as one member is the number of the other member."[12]

Torgerson selected the three characteristics because they correspond with a common distinction made in the types of measure scales that are often assigned. Corresponding with the ordering characteristic is the so-called ordinal scale of measurement which is, next to Stevens' nominal approach the weakest type of scaling.[13] These ordering measurements are monotonic in the sense that they are order preserving when translated from the characteristic to the number, and are common in accounting, e.g., the typical account numbering of current assets.

---

[12] Ibid., p. 15. Stevens distinguishes four kinds of scales: Nominal, ordinal, interval and ratio. Nominal scales require little more than determination of equality. Ordinal scales require the determination of greater than, but the intervals may be unequal. Interval scales imply equality of intervals (differences), but the zero point is conventional. Ratio scales permit the determination of equality of ratios and imply an absolute zero. Clearly accounting uses all types. See S. S. Stevens, "On the Theory of Scales of Measurement," op. cit., pp. 677-690.

[13] C. H. Coombs places a quasi-ordered or "partially-ordered" scale between the nominal and ordinal scales. The objects themselves can be non-ordered or partially ordered, or fully ordered, and the properties can also be of the three types. See "Mathematical Models in

A refinement of the ordinal scaling process ties the scale to a zero point, without implying that the distance between numbers represents equal intervals. Accounting is full of these measuring scales. The length of time an account is overdue is ordered -- in the usual case without special explanations -- with the probability of collection; the amount of quick assets may be related in such a fashion to the firm's shortterm debt-paying ability.

Perhaps the most common type of scaling makes use of equal intervals and makes use of the "distance" attribute of the natural numbers. The most common variation of this scale is the so-called ratio scale that has a specified zero point or a natural origin of some kind. For a finite set the numbers that identify the degree of a property along with the assumption of equal intervals will determine the scale completely. As Torgerson points out on a ratio scale the linear transformations that are allowable are limited to those that leave the natural origin unchanged, while if there is no natural origin with an equal interval scale, we are at freedom to select the zero point. The result then is that we may use any type of linear-transformation mathematics.[14] Let us now turn to some of the devices used to establish scales, especially the devices employed by psychologists.[15] It should be obvious that one should have the property to be measured clearly in mind. Some writers have been concerned with differences between "fundamental" and "fiat" or sometimes "derived" measurement. For our purposes these distinctions and the postulation of some sort of "natural" law of assignment are not important. One must realize that some properties such as length have operational rules (rules of correspondence) which relate the concept to

---

Psychological Scaling," Journal of the American Statistical Association, XLVI (1951), pp. 480-489.

[14] Warren S. Torgerson, op. cit., pp. 19-21.

[15] Torgerson takes pains to point out the relationship of measurement to theory formation and model building. "...fundamental measurement itself is an example of the construction and verification of theories. Any particular scale type can be considered to be a formal model. If rules of interpretation are laid down which connect the model to observable data, the model becomes a theory, and as such can become subject to empirical test." Ibid., p. 25. Note also: "The meaning of the numbers assigned to the elements of the model is specified by the model. Rules of correspondence are established, relating elements and properties of the model to observable data, thus converting the model into a testable theory." Ibid., p. 38. Incidentally Torgerson, in turn, leans heavily in this area on Carl G. Hempel, Fundamentals of Concept Formation in Empirical Science (Chicago: University of Chicago Press, 1952).

its measurement rules directly. On the other hand, "proprietary interest" is essentially a constitutive definition and its passage to the empirical world for measurement is usually done indirectly by its relationships to assets and liabilities which can be measured more or less directly through acknowledged rules of correspondence. A measure of social income, for example, is certainly not going to be measured "directly" or by any so-called fundamental laws of nature. What is done, of course, is to define a limited concept of social income in terms of some properties which *can be measured* by empirical means and which have some intuitive relationship to our feeling of what social income *ought* to be.[16] This limited concept is then substituted for the more desirable one. Theorists in any field may profitably study and appraise discrepancies between the constructs that are in fact measured with the constructs that are desired. In accounting, for example, it is extremely doubtful whether current working capital measurements are adequate substitutes for debt-paying ability.

Psychologists have divided their experimental approaches to measurement into three groups: the subject-centered, the stimulus-centered, the response approach. In the subject-centered approach, "*the systematic variation in the reactions of the subjects to the stimuli is attributed to individual differences in the subjects.* The immediate purpose of the experiment is to scale the subjects, who alone are assigned values."[17] This procedure is widely used in intelligence testing and general testing of physical or mental accomplishment in school work. The stimulus-centered approach, as the name suggests, aims at scaling the stimuli and the subjects, and in keeping with the broader psychological approach that takes the simple stimulus-reaction approach as too simple, the immediate purpose may be to appraise the importance of each at different times.

In the field of accounting we are confronted with the fitting of information to the uses for which it may be put. Thus, a practitioner weighs the attitudes of the users of information and tailors the information to fit his weights. Yet the problem is a dynamic one, and it is possible to change the attitudes of users. He might therefore wish to simplify the approach so that he can scale the information (the stimuli) with respect to a standardized set of user reactions for different

---

[16] With regard to fiat measurement Torgerson states: "...one or more observable properties are selected which on *a priori* grounds are judged to be related to the concept of interest. A measure of the observable property itself...is taken as the measure of the concept of interest....The discovery of stable relationships among variables so measured can be as important as among variables measured in other ways.... The major difficulty with measurement by fiat is the tremendous number of ways in which such defined scales can be constructed." *Ibid.*, p. 24. Notice Torgerson's non-positivist approach in his use of "natural laws," "fiat" and "a priori."

[17] *Ibid.*, p. 46.

"education" levels. The ultimate aim is, of course, to improve the usefulness of the information service, and the changing educational level along with constantly changing conditions mean that the adjustments must be made in a dynamic fashion and must be responsive to both possibilities. In the short-run however practically all problems including variations on the price-level problem can be set up to scale user reaction, and the urgency or desirability of new measurement rules must be resolved in a subject-oriented context.

Yet these distinctions are not as clearcut as one would like. All approaches require judgment. The subjects may be asked to judge which assets seem more liquid, which arrangement stresses A more than B, which form of disclosure seems more forceful. If such requirements are transitive, they may be ordered and subjected to an ordinal scale of measurement.

Let us return to some of the methods or procedures used by psychologists and others to establish scales of measurement. Regardless of the method used, the experiment is usually done over and over with the same subjects or with different subjects or with a combination. This *replication* is, of course, one of the tools often used in scientific work, and such repeated samples or judgments help to eliminate errors that may be present.

A common approach makes use of the ability of subjects to discriminate and often is known as the differential sensitivity method. The "just noticeable difference" is sometimes known as the *jnd* or the difference limon or the DL. The first problem encountered is that the just noticeable difference may be "noticed" in some cases and not in others so that some supplementary rules must be established. The subject may sense a difference 50% of the time almost by chance, so that a noticeable difference is inferred only if he differentiates, say, 80% of the time. The second step is the formation of the scale. In some cases it can be assumed that the noticeable differences (the DL's) themselves make up the units of the scale. Explicit allowances and replication may be necessary if the subject becomes more skilled or more discriminating at one end of the scale. In any event, it is assumed that the discriminations are transitive and that they represent equal distances on the scale.[18]

---

[18] Torgerson states: "If a stimulus *B* is 'just noticeably greater' than stimulus *A*, and stimulus *C* is 'just noticeably greater' than stimulus B, then the *distance* on the psychological continuum that separate *A* and *B* is equal to the distance separating B and C. This notion may be taken as an assumption subject to further test, or as a definition of what is meant by equality of intervals on the psychological continuum....Given the definition of what is meant by equality of intervals, i.e., equality of *jnd's*, we have only to devise experimental methods for obtaining *jnd's* in order to obtain a scale possessing a unit of measurement." *Ibid.*, p. 133. For a more complete discussion of this and following procedures see: P. Guilford, *Psychometric Methods* (New York: McGraw-Hill Publishing Co., 1936 or 2nd ed., 1954).

The above form of discrimination requires comparative judgment of related pairs. One is faced immediately with the possibility that discriminations may have different intensity. For example, suppose that A is judged brighter than B 90% of the time and B is judged brighter than C 70% of the time. Is the distance from A to B greater than the distance from B to C? Thorndike attempted to meet this problem by postulating that the differences in distance are proportional to the normal deviates of the statements. As Torgerson states:

> The general notion "Equally often noticed differences are equal" is thus transformed to the notion that the psychological distance between stimuli is proportional to the normal deviate transform of the proportion of times the (directed) difference is noticed.[19]

In some cases it may be feasible to ask the subject directly for his judgment of quantitative distance. This method is demanding on the subject and assumes that he will be able to estimate the distances and place them on the scaling continuum. This type of scaling is done in examination marking by all teachers, and its most common expression is probably a marking scale based on 100.

The estimating task may be made easier for the subject by applying what are known as "fractionation" methods. In this process the subject is given a standard of some kind (e.g., zero and A = 100), and is asked to select others that are one-half as great, or twice as great, etc. This differs from the previous process in that the subject need not directly estimate the size of the unit. He is asked for a fraction of the given standard, and the researcher then determines a convenient unit. A variation of this approach requires a still more limited ability of the subject and asks for estimates of equidistance. This approach assumes that the subject is capable of stating whether the difference between A and B is greater than say the distance between B and C. It goes without saying that if he is able to determine greater than or less than he can arrive at reasonable approximation of equality.

---

[19] Warren S. Torgerson, op. cit., p. 155.

> "1. Each stimulus when presented to an observer gives rise to a discriminal process which has some value on the psychological continuum of interest.
>
> 2. Because of momentary fluctuations in the organism, a given stimulus does not always excite the same discriminal process, but may excite one with a higher or lower value on the continuum...
>
> 3. The mean and standard deviation of the distribution associated with a stimulus are taken as its scale value and discriminal dispersion, respectively." (pp. 159-160).

In some cases a preassumption is made about the distribution of scale value of the stimuli. For example, it may seem intuitively evident that the distribution is normal or in some other familiar pattern. If such a preliminary step is feasible, the stimuli can be ordered, and once they have been ordered, the fitting of a scale according to the distribution is not a difficult chore.

Before turning to specific measurement problems in accounting some philosophical aspects of measurement may be summarized. The similarity between simple classification and more colorful quantitative knowledge should be clear. A quantitative scale with differences that can be related to "distances" between symbols in the real number system can enlist some of the methods and strength of mathematics. Notice however that some concept of distance is necessary. Ushenko points out that all measurement reduces to "observations of coincidences on scales or dials, the problems of measurement are reduced to the problem of measuring length, of which the major problem is how to determine whether graduations on a scale are congruent...[20] The so-called scientific laws almost invariably call for measurement, and measurement depends on observation and transitivity. With this view there is always the possibility of more accurate measurement with the effect of modifying or setting new laws, equations and definitions. According to Ushenko: "...should this happen, the old correlation, being a definition...would not become false. But the assertion that there are physical processes which can be identified with the synthetic statement would then become false."[21] In pre-Bridgman times (and unfortunately today in some areas of accounting) one of the rules of the scientific game was not to question the invariability of the rod. "From this point of view the selection of anything as a standard of measurement is equivalent to a convention that this thing remains invariant throughout the process of measurement. The operationalist theory is an alternative that ...explains measurement as a set of operations performed in accordance with specific but arbitrary instructions or rules, among which there are rules how to select a measuring rod....Whatever happens to the rod is irrelevant to the results of measurement provided the specifications of the rod are in accordance with the instructions.[22]

---

[20] A. P. Ushenko, The Theory of Logic (New York: Harper & Brothers Publishers, 1936), p. 157.

[21] Ibid., p. 156.

[22] Ibid., pp. 158-159. Apparently too many accountants have accepted the instruction to use an historical monetary unit and have not questioned whether the accounting constructs thus operationally defined have any relevance to needs. Physicists have similar problems. "In view of...experimental results, one is led to postulate that stretches are congruent at a distance if they prove themselves to be congruent when adjacent. In effect, we postulate that the distance between two points on a solid body is unchanged in a displacement....it is meaningless to ask if there were a more fundamental definition of length or distance." Victor F. Lenzen, op. cit., p. 290.

The fusing of mathematics and logic has helped restore some status to classification. The logical development of classes and the similar development of mathematical set theory now mean that powerful mathematical tools may be applied to qualitative (non-metric) knowledge. To know that x belongs to the class 'dog' is to know quite a bit about x without having seen him. From our knowledge of the class we know something about his habits, his reproductive cycle and methods, the number of his legs, his covering, etc. At this point we need to remember that the ability to discriminate is necessary for both qualitative and quantitative thinking. In fact, discriminating is more primitive than pointing (specifying) and pointing is certainly more primitive than naming.

There are many unsettled questions of measurement in accounting. Perhaps the most interesting and important applications arise in scaling future prosepcts into some system of values. The actual rules for recognizing value changes require the definition of new concepts and operations to be substituted for the value construct. Revenue is defined operationally by naming the things to be done to identify and measure it. Expenses are related to rules for measuring cost (sacrifice) and then to further rules for allocating cost to current revenues and to future expected revenues. Thus we agree on a set of instructions for measuring cost and agree to accept the resulting quantity as a measure of sacrifice. Another set of rules is then devised to measure the cost to be matched with revenues. This second type of measurement is an attempt to reflect prospects sacrificed to procure the new values represented by revenues and requires a scaling of expected benefits and the application of the ratio of benefits expired to expected total benefits to the costs to be allocated. The resulting system of definitions and relations is related to time periods and the results are given in income reports. Income, defined in terms of these operations, may differ considerably from non-accounting definitions! Thus in order to measure value to be added or decreased, accountants exhibit a whole series of substitute constructs with rules of correspondence to the empirical world. In each case these constructs themselves require their own scaling and measurement rules. Accountants then devise and issue instructions for combining the intermediate definitions and agree that the result of these measurements shall represent the change in value from operations. The resulting construct of value added, for example, is not quite the same as the one defined as income because of disagreement over capital gains and losses and realization rules. (Of course provision is made in the rules for additional investment, where the value added is offset by sharing the future prospects of the business or of claims to be satisfied.)

A little reflection will show that a concept of income in terms of being better or worse off is literally impossible to scale without making wild substitutions of this type. In fact, the economist's entire concept of discounted expectations is almost impossible to implement in terms of workable rules and needs some support before being substituted for the concept of being better or worse off. In summary, it should be emphasized that such expressions as: "Intelligence is what intelligence tests test," or "Income is what results when accountants apply their rules for measuring income," are true enough in themselves. What such expressions fail to explain is that constitutively defined constructs are

related to our needs and that substitute constructs are to be judged good or bad to the extent that they accomplish results similar to those derived from measuring the original construct directly. There is nothing to be ashamed of in being unable to measure many desirable constructs from "theoretical space" -- e.g., constitutive definitions that have value in a context of given objectives. The trick of substituting something that can be measured for something we would like to measure if we were more competent is well established in scientific work.

Several relatively minor observations may be made at this point, although a detailed discussion may fit better elsewhere. For example, the question of a constant interval scale (straightline) as opposed to a scale that takes account of the time value of money (an exponential) must be faced in dealing not only with depreciation but also with expectations in any form including those dealing with benefits. When we add compound-interest methods we are changing from a linear scale to a non-linear scale for measuring expected benefits. Notice also that if we change the discount rate we are changing scales, even though each is a nonlinear scale of the same family.

We might also ask whether an additional scale is needed to show "confidence" in the accuracy of the measurement or in the adequacy of the theoretical construct. Perhaps we should try to incorporate the degree of confidence or lack of it in the measurement scales that represent value. The long-lamented but tenacious doctrine of conservatism is designed to "allow" for uncertainty by a preliminary screening of the data before it is carried to the usual scale and perhaps also by weighting the scale itself in favor of poorer current reports. Wholesale conservatism is objectionable not because it is a crude attempt to allow for differences in reaction patterns. The objections are that a general prescription to "tip the scales" in some direction may be opposed to the use of best professional judgment and that the use of non-linear scales reveal the amount of the "allowance" and are usually appropriate.

A related problem arises through combining measures whose accuracy are widely different. To some extent this is unavoidable, for the measures that make up complicated constructs contain no reason to suppose that the accuracy can be or should be the same in each case. The measurement rules for taking value declines in buildings for example are less reliable than those for taking interest on government bonds, and the two measures along with others are combined to help form the indicant for income. Again, the objection is not that they are not done with equal confidence -- the objection is that they are combined and all are treated as meriting utmost confidence and without disclosure of shortcomings.

An interesting and important case of measurement concerns the evaluation of different types of disclosure. For comparing the relative strength of a footnote with a similar statement adjacent to the item it modifies we do not have any standards at all. Is there for example an ordering that corresponds with the placement in the statement of financial condition? Are there enough lazy readers to justify the belief that the first few lines of the statement are most likely to be read? Actually accountants have never examined this hypothesis in a formal way. We may

also ask whether the last places in the statements are less important than say the intermediate places. Is there a sharp break between the body of the statement and the body of the footnotes? How much is the situation helped by such statements as "the accompanying notes are an integral part of the statement?" If such a statement is made, where should it be placed for greatest effect? We have hardly begun to consider these kinds of things, yet they should be tested by experiment, ordered, and scaled on some measurement scale if possible. To many outsiders accountants have hardly begun to learn their craft.

Clearly the internal composition of the disclosure note has some connection with the strength of disclosure -- at least for those who read it. Our body of empirical information in related fields is so meagre that it is of little service. Additional information might be gathered to indicate the importance of sub-totals in the statements; the influence of indendations; or the use of heavier print for items that deserve emphasis. This material is in the field of pragmatics, it is psychological in nature, it is important, and accountants are not studying it!

The following discussion of financial-statement arrangements is meant to illustrate the need for careful ordering and to suggest areas of study that students might investigate. Does the order in the financial statement indicate the order of accuracy of measurement of the individual items? A positive case has some support, for it is probably true that cash is the most accurately measured; receivables may well be second best; certainly the intangibles rate last. But if we agree that the order of location represents the order of our confidence in the accuracy of measurement, can the ordering of accuracy be scaled? It is doubtful that an ordinary distance scale could be applied meaningfully, but it may be possible to set up some sort of function that would scale the differences. The measurements differ in accuracy among firms and among themselves from statement to statement, but such a scaling might have general validity and be useful to those who use statements. It might even be feasible to place accountants themselves and accounting firms on some sort of scale of relative accuracy or relative conservatism, so that users of accounting output could apply these indexes to reported statements and gain some better measure of comparability. Revenue agents often have the equivalent of an informal scaling of the honesty of professions and types of workers in assessing their own taxes. Undoubtedly their knowledge extends to the relative readiness of certain accounting firms to claim immediate deductions for their clients.

On the other hand, perhaps the order of location on the financial statement may be used to scale the relative importance of the items. It may be possible to set up experiments to measure the psychological distance between places on the balance sheet, and it is not inconceivable that an arrangement of items in the order of dollar importance would result in more meaningful statements and better understanding. Unfortunately the dollar amounts may not themselves measure relative importance. For example, when a firm is having short-term financial difficulties the amount of cash on hand may have an importance far out of proportion to its amount. The fact that almost without exception accountants place current items first may be due to preoccupation with current debt-paying ability and the

influence of bankers. Study might indicate that the trend toward this arrangement gathered impetus during or immediately after a financial crisis. Fixed assets are normally far more important in terms of dollar amounts, yet even public utilities and railroads have abandoned placing them first.

In a similar way liabilities on the balance sheet might be ordered as to, (a) liquidity -- urgency of asset distributions for their satisfaction, (b) definiteness of payment, (c) definiteness of amount -- accuracy of amount to be paid, (d) importance of dollar amount. At this stage we are not interested in the actual scheme of assignment. We are interested in understanding how accountants may possibly increase the number of information facets by classifying and ordering data.

It is also interesting to speculate about the relative importance of positions on the operations report. For example, does subtracting merchandise cost of sales from sales imply that this cost is recovered first? What about putting corrections of previous periods first so that the reader may judge how accurate past reporting has been? The usual argument is that the most prominent places should be reserved for the most important information. The volume of sales is usually given first. Should it be concluded that this is the most important item? What about placing net income first? Controllable costs first? These questions are empirical and can be tested by empirical means.

There is room for considerable study of accounting measurement in terms of whether the methods are response methods or subject-centered studies. In auditing, for example, accountants are trying to appraise the trustworthiness of the individuals who make the representations and also the trustworthiness of the representations themselves. What is the scale of trustworthiness? The amount of checking to be done is related to estimates of the adequacy of the internal controls in effect and on how well they are working. Is there a scale for judging the adequacy of such controls either on paper or in fact? The amount of checking done by an auditor is obviously related functionally to the auditor's appraisal of the trustworthiness of the *system*, which includes controls and the people involved. What kind of scales should he use? J-shaped? Logarithmic? Discontinuous with discrete points? More study!

Recently there has been considerable interest in the attitudes of investors, and at least one writer has tried to establish standards for good reporting, although so far he has not tried to scale deviations from the standards.[23] We need to set up experiments to find what investors read; what they value highly; how adaptable they are to new procedures -- e.g., how educable they are. Thus both subject-centered and stimuli-centered methods are needed. We do not know, for example, the importance of ratios in analysis. Is a current ratio of 4 to 1 twice as good as a

---

[23] Alan Cerf, unpublished manuscript. George Staubus has shown interest in the subject. *A Theory of Accounting to Investors* (Berkeley: University of California Press, 1961).

ratio of 2 to 1? Is the measure continuous? Does it match a linear scale? Are there "relevant ranges" for decisions of various kinds? Are there serious dangers in trying to estimate expected plans by scaling static levels at the beginning of the interval?

Preliminary studies in this area will scale primarily the habits and beliefs of investors, managers, and other individuals. At any specified time one may scale the relative influence of certain types of information, even though attitudes are changing. How fast do attitudes in financial circles change? How fast can users be "educated" to use new types of reports? Is there a pattern of accelerated development? Or are there thresholds and periods of change from discussion to use? Statement of fund plans and cash flow influences might serve as a pilot historical study. The importance of this area has increased tremendously after an unbelievably slow start. How much did the concept itself change? How much did the new concept change attitudes toward traditional income? Is there a relation to the needs of capital budgeting? To tax requirements?

Finally, accountants may ask whether the debit-credit rules themselves are types of measurement. The purpose of these rules is to indicate changes resulting from certain events in a firm's history. In this sense they correspond to some aspects of plus and minus rules. The assignment of position to indicate direction of change is combined with a natural zero element and qualifies for nominal measurement.[24] Unfortunately there is no ordering in the basic debit-credit rules and we must add further measurement rules to provide higher-type measurement scales. "Assets = Sources of Assets" is true if and only if the scales selected to measure assets and sources of assets make the equation true. Thus it is a tautology only after the measurement rules have been selected. We might, for example, measure sources of assets in terms of the number of individuals contributing or the number of physical items, or by other rules without much purpose. The equation does not specify the exact scales, but if offers a very important constraint on the scales that are selected.

---

[24] Chinese-Indonesian bookkeepers place the credits on top and debits on the bottom. Dr. Hadibroto has summarized parts of: De Boekhoudingen van Chineezen, Japanners, Britsch Indiers en Arabieren (Djakarta: Dienst der Belastingen, 1939).

BELIEF, EVIDENCE AND THE NATURE OF PROOF I

All professional and intellectual fields have their own problems of evidence and proof. The importance of evidence in legal matters is known to all. Historians have especially difficult problems of sifting evidence from sources that are almost always incomplete and biased. Internal bookkeepers and accountants need certain elementary notions of proof and evidence, but auditing as a profession cannot survive without adequate and comprehensive standards for reaching opinions and judgments. The typical legal curriculum contains a formal course devoted to these matters, and graduate students in the field of history may be required to devote some time (even a course or two) to the area of historicity and historical method. Unfortunately, accounting students are often told that they must develop the "feel" for adequacy of tests and other evidence from practice. This situation is unfortunate because practitioners are often not interested in philosophical and related matters. It seems clear that mathematicians, logicians, statisticians and philosophers are interested in the more abstract aspects of evidence and proof, and any serious discussion of these relations must include a survey of their efforts. It is the purpose of this and the following essay to present an extremely elementary account of the nature of proof in these fields and to review briefly the kinds of evidence that are available to the auditor. Emphasis is placed on the psychological basis for proof and on the psychological attitudes necessary for the support of belief.

The discussion begins with a general treatment of the problems of establishing belief and weighing evidence. These general remarks are followed by a somewhat detailed examination of the meaning of "objectivity" and the distinction in science between private and public information. The first essay closes with a brief look at problems of evidence in the field of law. The second and concluding essay on the topic deals first with problems of induction, statistical inference, and explanation. These topics are followed by a brief discussion and illustration of proof in logic and mathematics. Some accountants may wish to omit the second essay entirely or to cover selected sections of it. In order to encourage this time-saving approach there is a slight duplication of material. Very general comments and conclusions about subjective probability, decision theory and Bayesian statistics along with applications of logical rules of inference are mentioned in this chapter.

Apparently the human mind often hopes to discover absolutes, and the quest for invariant relationships has been an important part of intellectual activity. One manifestation of such an attitude is found in those who hope to find proofs so devastating in their impact that all who understand their structure will be convinced and all doubt will be banished. In general the student is better advised to abandon such an inflexible conception and accept a relative approach that leads to a re-

duction in, or at best a temporary banishment of, doubt.

In mathematics the truth of some statements appears to be "obvious," but the truth of a statement that is obvious to a layman may be highly uncertain to a trained mathematician or vice versa. It is the purpose of formal proofs to make the truth of some statements seem to be obvious by relating them to other statements which have already been accepted as true. Kershner and Wilcox express this viewpoint clearly.

> It has already been mentioned that the theorems of a mathematical theory consist of assertions whose truth is usually not obvious. For this reason it is necessary to give a proof, that is, a series of statements which makes the truth of the theorems obvious....When properly used, the word [obvious] refers to a statement of implication whose validity will be immediately accepted as apparent by the audience....All that is required of a proof is that it convince the audience of the truth of the implication at hand....there is no simple test that can be applied to determine the validity of a proof, that is, to determine that an alleged proof really is a proof.[1]

The fundamental requirement of a proof is clearly that it be "psychologically satisfying" -- convincing -- for the persons to be convinced. In this essay we are interested first in how one goes about the business of convincing (establishing satisfaction), and second we are interested in speculating about the sociological forces that shape professional attitudes toward proof and establish necessary evidentiary requirements. The discussion of the first objective takes the form of an elementary discussion of proof in logic and mathematics with references to statistical inference. The discussion of the second objective is concerned primarily with the problem of determining attitudes in the field of auditing.

Accountants and other non-specialists in the field of formal logic or mathematics are often surprised to learn that the laws of logic and the rules of inference are "conventional" where this term is meant to imply that the procedures are generally accepted in the same sense as "generally accepted accounting principles." In some cases the realization that such laws are not "outer directed" may lead to a skepticism that is far from satisfying, but it must be remembered that these laws have been indispensible to the practical business of living, and these conventions are in no way arbitrary, haphazard or entirely academic. The reader may wish to refer again to Essay I, which contains a discussion of the rules of logic as the product of experience and observation as opposed to the view that considers them to be beyond experience, i.e. metaphysical. For our purposes it is essential to recall that there are alternate rules of logic and that the current acceptable ones are the result of judgment and belief in their usefulness and adequacy.

---

[1] R. B. Kershner and L. R. Wilcox, The Anatomy of Mathematics (New York: Ronald Press Company, 1950), pp.76-77.

Before turning to the more familiar kinds of evidence in accounting, let us emphasize the psychological elements of proof as applied in logic and mathematics. The somewhat complicated and impressive apparatus of logic is likely to obscure the psychological implications. It has been suggested by some that even the use of truth tables in the logical calculus is an interpretation in the same sense that algebra, geometry and mechanics are interpretations. To this group the "T's" and "F's" of the truth tables could be used in abstract logic without any implications of true or false. Such interpretations have offered yeoman utilitarian service, and on the basis of effective results some interpretations that are not at all obvious have been accepted. To many geographers the following valid implication intuitively seems to be an unconvincing segment of logic. "If New York is in California, then Los Angeles is in California."[2]

In the field of induction and statistics the nature of evidence and proof becomes more obvious and their relationship to accounting and auditing becomes more clearcut. Modern investigators make use of all the intellectual accomplishments that are available for help in resolving their problems. The most widely used and generally satisfactory development in this line has been the growth of knowledge in the field of statistical inference. This bundle of tools is the legacy of one of the major intellectual achievements of the last century. Although accountants have been slow in utilizing these techniques, the last decade or two has seen a gratifying acceptance and at least nominal utilization of these advances in the auditing field.

An investigator has reached an important threshold when he is reasonably sure that there is only one chance in twenty that the observed data ~~is~~ are not accounted for by his recognized factors. But are such odds -- even though they be accepted as unquestionably accurate -- sufficient to support a belief or to prove a position? At what point do auditors concede that the figure for receivables is "substantially" correct? It is perhaps fair to say that the typical person has an endlessly complex hierarchy of beliefs. About some of these beliefs he is "certain;" about others he is less sure, until we may find a rare human who has no opinion on the subject at all. Does confidence develop proportionately with the evidence? Perhaps there are thresholds of confidence -- none over a considerable range, then a little, followed by a surge that overwhelms and cannot be resisted. A little reflection will show that the problem and its answers are behavioral and that statistics helps us only in an auxiliary way. This conclusion does not deny that all methods of arraying probabilities and evaluating evidence should be explored and that to neglect them is to neglect valuable intellectual equipment. What is

---

[2] The following distinction between judgment and belief is from A. P. Ushenko: "Acceptance or rejection of a proposition is called a judgment; it is always an individual act....The psychological disposition to make judgments which assert a proposition may be called belief in that proposition...." The Theory of Logic (New York: Harper & Brothers Publishers, 1936), p. 27.

meant is that confidence is a psychological reaction and that proof is a definition -- a name given to the level or *degree of confidence* that is convincing and satisfying to the individual or group involved.

Tremendous strides have been made recently in the direction of combining subjective elements with traditional statistics and developing the combination into a theory of "rational" decision. This Bayesian approach practically defines statistics as "...a body of methods for making wise decisions in the face of uncertainty."[3]

Roberts continues: "The Bayesian approach argues that whether we like it or not, we should first implicitly or explicitly assign a weight to each event. If these weights are assigned according to certain rules of consistency, they deserve to be called *subjectivistic* or *personal probabilities*....It is useful to think of a probability in terms of the odds at which you would be indifferent..."[4]

Among the advances most useful for accountants is the Bayesian technique for modifying early (prior) valuations in the light of further information (likelihoods) and obtaining revised (posterior) probabilities. It should be clear that a formalized scheme for revising opinions in the light of further information should be extremely valuable. With or without a formalized approach such revisions must be made. Experience with odd-shaped coins or dice permit us to revise our predictions. Our accumulated knowledge of certain regular physical characteristics sometimes permits us to predict with limited revision.

In appraising odd-shaped articles the initial probabilities may need to be modified drastically as experience accumulates and behavioral regularities appear. Auditors review the system of internal control with the hope of determining the configuration of probabilities of certain errors. On the basis of this review (similar to sizing up the shape of the coins or dice) we draw elementary (prior) judgments -- probabilities.

---

[3] Harry V. Roberts, *Statistical Inference and Decision* (Lithoprinted, Chicago: By the author, 1960), p. 1-2. Roberts points out that the present upsurge in subjective statistics apparently springs from the Neyman-Pearson deviation from traditional statistics. Abraham Wald added utility assessment, and modern Bayesians added "the principle of maximizing expected utility." A rigorous (axiomatic) approach is given by L. J. Savage, *The Foundations of Statistics* (New York: John Wiley & Sons, Inc., 1954). For a more understandable exposition see Robert Schlaifer, *Probability and Statistics for Business Decisions* (New York: McGraw-Hill, 1959) or the abbreviated and condensed version, *Introduction to Statistics for Business Decisions*.

[4] *Ibid.*, p. 1-7.

The audit can be started with these probabilities in mind. Further information is gathered about the actual operation and effectiveness of the control system as the audit proceeds. Probabilities (judgments) may be changed on the basis of the added information, and the course and extent of the audit itself is often changed to meet the changed judgments.

Without dealing with substantive material we should observe the criteria for changing the course of the audit to "meet" changed judgments. The Bayesian approach makes use of utility assessments. A word of warning is necessary to those who are accustomed to dealing with utility in classical economics. The modern definition is general. Roberts states: "A utility is a conditional value that you attach to a consequence of an act such that you will always prefer a consequence of higher utility to one of lower utility."[5] This definition itself does not seem to be very helpful, but the Bayesians have done much to make the definition operational.

It should be clear that the concept of utility is entirely subjective and that a money gain or loss may be a poor approximation of the individual utility function. Yet as a starting point it may often be assumed that the utility schedule is linearly related to income or loss. Modifications may then be introduced for deviations, critical areas, nonmonetary objectives, etc. The usefulness of utility assessments is increased by providing a framework for judging widely varying probabilities and consequences. Bayesians tend to use a betting-odds interpretation of probability and to reduce complex problems of utility assessment to simple betting situations. Roberts states the case clearly.

> The fundamental idea is to calibrate the utility of any consequence of action by comparison with an uncertain situation in which either a worse or better consequence might obtain....we do not need utility theory to tell us that we prefer more income to less or that we prefer a higher to a lower probability of winning a desirable prize. [We assume (postulate) this type of behavior.] Utility theory is useful because the concept of expected utility serves as a guide for evaluating complex risky situations on the basis of our evaluation of simple ones.[6]

For auditors this advance in statistics offers a procedure for meeting an old nemesis -- the fact that not all errors are equally grave. The betting-odds approach to utility assessment may provide a framework for weighing the complex hierarchy of errors, and when combined with the apparatus of prior probabilities, likelihoods and posterior probabilities, may permit the profession to examine its own structure for opinion formation and change. The actual weights used, i.e., the seriousness of different deflections, is a subjective matter, and statisticians

---

[5] Ibid., p. 3-1.

[6] Ibid., pp.3-3.

as statisticians are not directly interested in the size of particular weights. The latter problem is a problem that must be met -- explicitly or implicitly -- by the auditing profession. It should be clear that all future auditors should have some knowledge of subjective probability, but being good Bayesians is not enough. They must add some study of sociology and social psychology for clues as to why the profession's relative weights are what they are.

It is the contention of this paper that proof -- the establishing of belief -- is socially determined except in the simplest cases, e.g., direct contact with fire leads to burns. Moreover in the more abstract cases the "rigor" of the required proof is adjusted to the consequences of wrong conclusions and to the burden -- cost -- of added rigor. At all times there must be an incremental balancing of the additional cost of an added increment of rigor with the expected benefits from the added peace of mind that comes from higher confidence levels. Once the concept of proof as an absolute has been dispelled, the way is opened for a detached weighing of evidence without the feeling of inferiority that sometimes results from a standard of unattainable perfection. In such an intellectual model one strives for a higher rather than a lower degree of success in prediction so long as the expected benefit is in excess of the added sacrifice.

No one suggests that such a model is applicable to all kinds of cases, and in this connection the model shares common shortcomings with the "economic man" and the "trained scientific observer." Certainly the probablistic approach is essential, for we are never sure of the benefits to be derived. At first sight it would seem to be ridiculous to spend a thousand auditing man-hours to be a little more "sure" that a petty cash fund of a few hundred dollars was handled properly and honestly. Yet to an internal auditor a comparatively small error in amount may be an indication that the internal control structure upon which so much accounting judgment rests has broken down. If such controls have in fact broken down, then the amount of work done in other features of the audit may be far from sufficient to constitute proof in other directions. If however the internal controls are tight in this area, the amount of work already done in related areas may be sufficient to support a judgment of "correctness." In a general way the seriousness of accepting as satisfactory a set of circumstances which are in fact unsatisfactory or vice versa would always be related to the level of confidence that must be supported by evidence. It should be emphasized that the seriousness of the wrong decision may not be represented accurately by the number of dollars that seem to be directly involved, i.e., the seriousness cannot be scaled on a linear dollar scale.

Perhaps one can find an example of this type of confusion in the work of some auditing teachers. It is sometimes -- fortunately not often -- pointed out that students must get the "feel" of auditing in practice, and now and then it is asserted that such a feel cannot possibly be procured in the classroom. Assuming that the feel of auditing is concerned with judgmental problems and not with the more obvious aspects of observing the documents in a context of filing cabinets, this position is roughly equivalent to holding that the standards of adequacy

for proof are set by those in practice and not by those in universities. In the past this condition undoubtedly has been the case, but it is a deplorable condition. It is imperative that educational institutions encourage those who have the capacity, experience and vision to analyze and to generalize such problems for all professions. Those concerned with the psychology of learning will probably agree that there is some inefficiency in learning professional objectives and value systems under the pressure and bustle of a deadline in a busy client's office and under the coercion of self-interest. No doubt techniques are learned best in concrete situations, but value systems and judgments are appraised better in the detached atmosphere of scholarship uninfluenced by the urgency of preparing to learn a trade or make a living.

The teacher, regardless of whether he is employed by a university or an auditing firm, can explain the nature of proof and the relationship of evidence to proof. An analytical dissection of evidence may proceed by source, by functions or persons involved, by ordering in time, by permanency, by psychological barriers, and by countless other attributes. Most auditing discussions hardly go beyond a simple classification by the individuals who prepared the documents. A classification of this nature may throw some light on the psychological threads involved and may be extremely important, but it is only a beginning of constructive work.

In another essay the conditions determining survival or rejection of ideas are discussed. Those who lead a profession are subjected to new influences, and the positions of contending groups change. Different weights become appropriate and subjective values held by the professional group change. Professional organizations, therefore, must provide channels for introducing change and weighing the advantages of stability against the advantages of change. Failure to react quickly enough to demands from other groups leads to legislative action (e.g., the Securities and Exchange Act), to invasion by related professions (e.g., income tax consultants), to split-off of new professions by members more sensitive to social needs than the constituted professional leaders.

Standards are what they are because those who are concerned have given consideration to the seriousness of judgmental error in various aspects of the work. Certain types of error may help certain groups and hurt others. Errors in certain directions may be more serious than similar errors in the opposite direction. Different situations call for a shifting of weights to recognize varying influence on the judgmental decision. The integrity of a profession tends to assure that the agreed standards are maintained in practice, for those in the press of practice may become overly sensitive to certain groups (perhaps to those who pay the bill) and less sensitive to others whose interests are just as worthy. In any case there is likely to be considerable dispersion of individual judgment and integrity. Such dispersion sometimes leads to unprofessional (unsatisfactory) work, but it provides a machinery through which suggestions for change often come. It is the primary task of education at the professional and university level to help and to encourage those who have the capacity and vision to analyze and to generalize the problems of a profession in its social context. Some techniques and procedures must be taught. Some knowledge of such matters is necessary before one can analyze and generalize. Unfortunately some universities have become con-

fused and stressed the manipulatory aspects and forgotten all but the more obvious analytical problems. Intellectual treason has not always been followed by oblivion, and intellectual Darwinism often has been influenced by economic considerations.

Objectivity

We need hardly remind the reader that 'objectivity' is a word. It is a word of unusual interest to a semanticist, because it has high-status overtones, and for accountants to be non-objective is to be dead. The meaning is thought to be opposed in some fashion to subjective. Our purpose here is to point out the relationship of 'objectivity' and 'subjectivity' to evidence. The whole universe of evidence may be partitioned into subsets that are supposed to be independent and exhaustive and labeled either objective or subjective. But what are the rules for distinguishing types of evidence and classifying them? How do we know whether the boundaries are sharp and there is no overlap? What is the distinction? How is the distinction related to the shopworn distinction between private and public information? How did the favorable connotations so often become associated with objective and the unfavorable with subjective? Why are accountants so interested in objectivity?

Accountants, especially those in public work, have been concerned with giving opinions on managements representations and intent. The highly private nature of intent and the desire for uniformity in appraising status and prospects have encouraged accountants to tie their rules of evidence to experience that may be shared and appraised in similar ways by others. Thus, the accountant's interest as an independent auditor is almost always identified with outside groups! He therefore is interested in adopting rules which reduce interpersonal variety in both auditors and users. A preference for the social-consensus approach to evidence is therefore to be expected.

Objective and subjective in the traditional sense require a division of the events (clues) into a string that is considered to be internal and another string that is external. Clearly one can have all sorts of clues and degrees of evidence. It is equally clear that one type of clue may arise so that by analogy it may be assumed that external individuals can also experience the evidence. With similar training in appraising clues, and interpreting and weighing evidence they can arrive at similar conclusions. In some cases "objective" applies only to the possibility that someone else could sense the clues, and the interpretation and appraisals are considered to be subjective. The latter approach is subject to the dualism that has always hampered philosophers. It assumes external existences with detached minds operating on them. For one who thinks of the world as a series of experiences it becomes clear that he must look elsewhere for the distinction between subjective and objective.

There must be some reasonably sharp criteria for discriminating events and classifying them as objective or subjective. Such is not the case. The distinction rests on readiness of access to the experiences that could lead to similar hypotheses and conclusions. To a non-dualist

external data simply cannot be used as the discriminating agent.

The usual approach to the problem is in terms of social consensus. But as is pointed out later this consensus is of "rational" observers or of "educated" observers. The creation of such entities as scientific man, economic man and rational man needs explanation, for they form an elite whose opinion determines objectivity. The term objective then indicates that there is (or could be) agreement and remains subjective until it is accompanied by the additional belief that others could replicate the experience. These "others" have already been judged and their stable reaction patterns predicted. The problem has shifted slightly, and we must establish the rules for determining the "stable" reaction patterns of others.

Scientists are certainly influenced by the environment in which they are brought up. Each generation sifts the heritage of previous generations and retains what promises to be useful. Accountants also are educated and influenced by the existing institutions in all things they do. In this sense all their beliefs and judgments are conditioned with respect to the nature of evidence and its adequacy. Even though I make the particular judgment on evidence that seems to be entirely private the bases and the procedures for making it are in part socially determined. One assumes that he is a rational scientific observer because he has been trained like others are trained. He can infer (by analogy) how others will observe, judge and conclude, if they are given the identical data and are products of the same educational process. He judges interpersonal relations and reactions by constructing an analogy based on assumed physical similarity and environmental similarities.

Before discussing some particular problems of objectivity in accounting let us turn to the place of replication in judgment formation. Replication is, of course, only one form of getting evidence, and it does not postulate external observers. For this reason it is a solopsist's darling. The test is in terms of observed uniformity from repeated experiments. The initial conditions are reproduced as nearly as possible, an input is changed, and the change in results observed. Considerable effort could be expanded in a discussion of the relative merits of evidence observed by several independent observers and evidence from repeated experiments with the same observer. In other words how much should one discount the possibility of differences in the conditions of replication and the use of a single observer instead of several?

Clearly replication can not be used in many cases, e.g., some astronomical observations and in those tests which require the destruction of the object. Many parts of accounting may be replicated. Accountants can retake inventory, recheck documents, etc., but they cannot make the identical events occur again. In the latter cases they observe reactions to similar events and draw inferences. Historians are in a slightly worse position. Historical events cannot be duplicated (each is unique) and similar events are not quite identical in initial conditions or in the impact of their change. Such historical work often consists of going over reports of the same events time after time and comparing them. The events are therefore inferred from the evidence, and the evidence often consists entirely of reports. Replication is little more than reexamining the records.

A curious condition peculiar to accounting is that many operations that are considered to be objective are, by all definitions, those most highly subjective. The going-concern concept, for example, implies valuations and estimated benefits for each separate asset in conjunction with all other assets and facilities. The replacement-cost and current-cost concepts usually involve estimates by others outside the organization and more nearly meet the consensus test than many historical costs. Moreover, market values in most cases turn out to involve more outside judgment and be subject to more social "consensus" than the usual writeoff of cost "in some systematic manner." We can check the outside data; others can check it, and any of us may be able to replicate it. What about estimates of future benefits? What could be less accessible to outsiders than the usual writeoff formula of benefits received over total benefits to be expected with the ratio multiplied times the original cost? If benefits are related to the estimated life of some physical property, there is an additional judgment to be made: the judgment of economic life. In a similar way original cost is relatively objective by most standards but a supplementary subjective decision is necessary as to whether the opinion of marginal buyers and marginal sellers at acquisition is an appropriate measure of value or of accountability for the firm.

Education for accountants tends to instill a uniformity of outlook and judgment among those in the profession. Thus to the extent that objectivity is defined as a social consensus, it is easier to establish because the institutions tend to make judgments and the weighing of evidence more uniform. Similar outlooks and professional indoctrination make it easier to get a consensus and therefore tends to broaden "objectivity." In a totalitarian state objectivity must be extremely high! Clearly this approach leads to difficulties, but so long as evidence is evaluated, the valuations will certainly be conditioned by training and environment.

The entire field of accounting, especially the region devoted to auditing, is concerned with objectivity, and the profession is irretrievably committed to interpersonal analogy and social agreement. It is possible for an individual to "verify" his work by repeating the operations or by designing new operations that can confirm his work. It is true that he is less likely to find his own errors because of any peculiar psychological twists that may have been followed or developed during earlier runs. Notice however that other auditors have been brought up in the same or similar environment and may also have a tendency to repeat the error and to follow a similar bent. The tendency may be less when different members are included, and it is probably also true that any special-interest incentives or desire to misrepresent would be averaged over a larger number of individuals with the expectation that differing drives for falsification may act as a deterrent.

Objectivity may be approached through stability of observation reports whether the reports are made by a single person applying replication or by independent observers. We are overlooking the obvious impossibility of ever furnishing independent observers from the same environment, i.e., conditioned by similar institutions. This impossibility weakens the consensus approach. Objectivity is important to many groups in addition to accountants. The following discussion is designed to

introduce the reader to the reaction of scientists to objectivity where the concept is extremely important and to introduce some sources for further study.

Objectivity in Science

> Those who have analyzed inquiry from the point of view of science in general have tended to conceptualize inquiry as a problem-solving process. Social scientists...have tended to conceptualize inquiry in a communicative process.[7]

The area of empirical data offers problems of its own. Those with philosophical leanings have been concerned with the psychological overtones of experience and have drawn distinctions of dubious merit between public and private experiences. Certain philosophers such as the empirical positivists (Wittgenstein, Carnap, Ayer, etc.) wish to use the term 'fact' instead of the more psychologically colored one of experience. Others have taken care to distinguish between epistomology and psychology and to point out that their positions require only epistomological assumptions. The following statement by Russell deserve repeating.

> ...if physics is an empirical science, whose statements can be confirmed or confuted by observation, then physics must be supplemented by laws connecting stimulus and sensation. Now such laws belong to psychology. Therefore what is empirically verifiable is not pure physics in isolation, but physics plus a department of psychology. Psychology, accordingly, is an essential ingredient in every part of empirical science.[8]

There seems to be no point in belaboring the psychological ingredient of experience. An attempt to escape the inclusion by referring to the less psychologically charged term 'facts' is certainly no escape, for facts are interpretations, and what appear as facts are psychologically conditioned and filtered so that little can be gained in this direction. Facts are abstractions and for validity must have all sorts of related conditions specified. The fact that an American metal coin is round requires, for example, an understanding about the position of the viewer relative to the coin and a minimum tolerance for irregularities. As will be suggested later the term 'fact' sometimes implies public confirmation while the more direct term 'experience' may have a more private implication.

Measurement itself must have psychological overtones, for measure-

---

[7] Russell L. Ackoff, The Design of Social Research (Chicago: University of Chicago Press, 1953), p. 8.

[8] Bertrand Russell, Human Knowledge, Its Scope and Limits (New York: Simon & Schuster, 1948), p. 49.

ment requires identification, search for similarities, ability to match ends, and a whole group of operations of this nature. In fact, any operational definition outlines instructions, and these instructions require discriminations and are therefore psychological. There is no escape by means of gadgets for measuring. What is measured may appear to be only shadows of what we hope to measure, but regardless of the complicated machinery involved someone finally has to make the discrimination necessary to determine similarity, congruence, transitivity and related relationships. Qualitative distinctions require the same type of psychological discrimination so that classification, ordering, etc., require similar treatment. In fact, it should be clear that all problems of interpreting an abstract system or calculus (finding the so-called rules of correspondence) require psychological operations. While there is some question as to whether the formal laws of logic and mathematics are psychological in the sense that their selection and retention is due to social selection, there seems to be little doubt that the main usefulness of logic and mathematics is considered to be in connection with their ability to permit rearrangements of sentences so that the new sentences will lead to new psychological insights.

It is possible, with some preliminary assumptions, to have a scientific structure and still hold to the solipsistic view which forbids making assertions or assumptions about the necessity of a world outside the mind of the observer. It is true of course that mind, when used in this...sense, cannot be classed as scientific without some special interpretation such as the patterning of all experience, but it is equally true that the assumption of an external world is also lacking in some of the characteristics required by scientific method.

A science with only one observer would seem to be a possibility with or without a specific ancillary assumption as to the presence or non-presence of the external world. Inasmuch as scientific inquiry has been considered to be largely methodology (scornfully "methodidolatry") it would seem that a world consisting of only one person could pursue scientific inquiry as we know it. The only problem here is in connection with communication and the question of how he learned to do what he does and how he got enough background information to be able to interpret his sensory data. Thus it would seem to be possible for a scientist to continue to be a scientist alone, but to be difficult to begin without previous knowledge. Yet some very elementary observations are scientific in their construction, and one must admit the possibility that Adam or Tarzan could have developed into first-rate scientists.

In view of these possibilities it is somewhat surprising to find that almost invariably scientists and writers on scientific method are concerned deeply with objectivity -- social consensus -- and the necessity for confirmation by others. In the extreme, the field of science has been identified as the field of the language of science without remainder. Here are some typical comments that are essentially "truth by definition."

Vatter states:

> Objectivity is the *agreement* of intelligent persons as to the significance of independently observed data; it implies not only separate experience or observation on the part of the different individuals but also a communal reporting of those observations...[9]

Pearson has expounded this point in detail.

> The universal validity of science depends upon the similarity of the perceptive and reasoning faculties in normal civilized men... In order that a conception may have scientific validity, it must be self-consistent, and deducible from the perception of the normal human being....But even if an individual mind has reached a conception, which at any rate for that mind is perfectly self-consistent, it does not follow that such a conception must have scientific validity...a conception to have scientific validity must be *deducible* from the perception of the normal human being... an inference which is scientifically valid is that which could be drawn by every logically trained normal mind, it it were in possession of the conceptions upon which the inference has been based. Stress must here be laid on the distinction between "*could*" be drawn and "actually *would* be drawn."[10]

Popper reports:

> ...ironically enough, objectivity is closely bound up with the *social aspect of scientific method*, with the fact that science and scientific objectivity do not (and cannot) result from the attempts of an individual scientist to be 'objective,' but from the cooperation of many scientists. Scientific objectivity can be described as the intersubjectivity of scientific method.[11]

The views of the scientific empiricists Carnap and Morris are below.

> ...it is possible to abstract in an analysis of the statement of

---

[9] William J. Vatter, *The Fund Theory of Accounting and Its Implications for Financial Reports* (Chicago: University of Chicago Press, 1947), Note 40 to Chapter V. Vatter gives credit to Frank H. Knight, "What is Truth in Economics?" *Journal of Political Economy*, February, 1940, p. 7. "Objectivity is a social, not an individual phenomenon..."

[10] Karl Pearson, *The Grammar of Science*, (Everyman ed.; London: J. M. Dent & Sons, Ltd., 1937), pp. 45, 49, 57.

[11] Karl R. Popper, "The Sociology of Knowledge," reprinted in *Readings in Philosophy of Science*, *op. cit.*, p. 361. Reprinted from *The Open Society and Its Enemies* (Princeton: Princeton University Press, 1950).

> science from the persons asserting the statements and from the psychological and sociological conditions of such assertions. The analysis of the linguistic expressions of science under such an abstraction is logic of science. (Carnap)
>
> It is an empiricism genuinely oriented around the methods and the results of science and not dependent upon some questionable psychological theory as to the "mental" nature of experience. (Morris)[12]

The requirement for interpersonal comparisons and interchange and therefore the requirement for a set of symbols to function as language is postulated by all who take the social consensus approach to objectivity and scientific method. Much of the discussion about public and private arises in an attempt to abstract from psychological and phenomenalistic aspects and still preserve intersubjectivity. Hempel for example, states.

> ...properties or relations whose presence or absence in a given case can be intersubjectively ascertained, under suitable circumstances, by direct observation....we will refer to such attributes ...as observation terms....objectivity of scientific knowledge... requires that all statements of empirical science be capable of test by reference to evidence which is public, i.e., which can be secured by different observers and does not depend essentially on the observer.[13]

The interpersonal nature of this kind of objectivity has been discussed by Russell, who seems prepared to accept it but realizes only

---

[12] Rudolf Carnap, "Logical Foundations of the Unity of Science," and Charles W. Morris, "Scientific Empiricism," both in the International Encyclopedia of Unified Science, op. cit., pp. 43, 68.

[13] Carl G. Hempel, Fundamentals of Concept Formation in Empirical Science (Chicago: University of Chicago Press, 1952), p. 22. Notice, however, that P. W. Bridgman has concluded that the creative part of science must continue to be "private" because the proofs upon which it is based must be private proofs. "...science is only my private science, art is my private art, religion my private religion..." The Nature of Physical Theory (New York: Dover Publications, 1936), pp. 13 - 14. See also: The Way Things Are (Cambridge: Harvard University Press, 1959). In the positivist view nothing can be attributed to private experience and such constructs as self, image and mind are not used. S. S. Stevens states: "Only those propositions based upon operations which are public and repeatable are admitted to the body of science. Not even psychology knows anything about private experience, because an operation for penetrating privacy is self-contradictory....Although a particular experimenter may himself become the object of study by another experimenter, and he in turn by still another, at some stage of such a regress an independent experimenter must be...assumed." "Psychology and the Science of Science," reprinted in Readings in Philosophy of Science, op. cit., pp. 163 - 164.

too well the shakiness of the additional postulate required. Thus to accept the social consensus doctrine we are forced to accept some notion of Vatter's "intelligent" man, Hempel's "public" evidence, or Pearson's "normal civilized" man. We are left with the assumption of an economic man with whom economists are for good reason extremely unhappy.

There is little doubt that the cult of objectivity arose in part, at least, to combat the dragon of authority in the institution of the church and in the person of Aristotle and many lesser lights. Yet it is clearly possible for intelligent people to be biased so that they agree on the "significance of observed data" (say, witchcraft) and according to the definition of objectivity that depends on social consensus the results are objective. Furthermore, how does one go about finding an "intelligent" man or "normal civilized" man? What are the specific instructions? All too frequently one tends to attach such labels to those who agree with him, for we are all -- in the sense of the sociology of knowledge -- a product of our institutions and our ideology. Not only can individuals thinking alone come up with some strange beliefs -- to paraphrase Keynes -- but whole societies of men can come up with some very strange views, and for an individual to break out of his environment may be difficult or impossible.

We may inquire also whether objectivity as a social consensus helps to break the boundaries of tradition and authority. Does social consensus mean, for example, total agreement? Majority agreement? Clearly it is some degree of agreement of an elite group. Apparently the consensus is usually put in opposition to authoritative pronouncements, and the "weight of evidence" becomes persuasion and ability to perform the experiment instead of fear or favor. Thus it might be said that the effect has elements of democracy, but an intellectual discipline can be subjected for long periods to the tyranny of the majority or the tyranny of an outstanding man of science such as Aristotle. Cohen's argument for authority and tradition in the following quotation applies with equal force to the need for group dependence on research.

> The essence of the argument for tradition and authority is the ~~the~~ actual inability of any single individual thoroughly to apply the process of reasoning and verification to all the propositions that solicit his attention. To doubt all things in the Cartesian fashion until they can be demonstrated is impossible.[14]

---

[14] Morris R. Cohen, Reason and Nature, (Glencoe: Free Press Publishers, 1953), p. 29. The following note from Whitehead on common sense could also be turned from tradition to consensus. "Now in creative thought common sense is a bad master. Its sole criterion for judgement is that the new ideas shall look like the old ones. In other words it can only act by suppressing originality." A. N. Whitehead, An Introduction to Mathematics (New York: Oxford University Press, 1948), p. 116.

Comments on the Legal Approach to Evidence

It seems to be characteristic of intellectual and professional workers to be optimistic about finding solutions to their own problems by observing other professions with similar problems. In fact this paper is devoted in large part to this kind of observation. Heretofore we have looked primarily at philosophers; let us now turn for a very brief look at the legal profession for possible guidance.

The legal profession has attempted to clarify its problems by maintaining a sharp distinction between fact and conclusion (opinion). It is possible that this distinction is so fundamental for legal procedure that legal judgments without it would be chaotic. This distinction is supplemented by a procedural framework that includes rules for expediting the presentation of relevant facts and machinery for promoting judgment formation. The first of these items is concerned primarily with rules of evidence and procedure, and the second depends on the ability of judges and institutions for reaching judgments. Let us now scan these legal procedures with the hope of finding material to meet similar problems in the accounting profession.

The distinction between fact and opinion is an indispensible one, but like all distinctions it has fuzzy frontiers. It is a commonplace of semantics that facts themselves are low-order judgments and have meaning -- are true or false or even relevant -- within an operational framework. Whether or not the statement: "A was sitting in a chair," is true or false depends on a number of things including such obvious things as: Does the support meet the definitional requirement for chair? Is the time interval definite enough for operational purposes? Is the person we now call "A the "same" person who is in question at the previous date? Certainly changes have been made, but perhaps we are not talking about the present "A" at all but a previous bundle of molecules and inhibitions that was at the specified time known to himself and to others as A. What if A was sprawling so that his position may be better described as reclining than as sitting?

The legal profession has developed a reasonably workable set of rules to meet these kinds of objections in actual cases. Notice, however, that if the distinction between sitting and reclining (or between any of the other alternatives) is important to the case, a judgment must be made as to whether A was *in fact* sitting or reclining. This judgment is over and above the judgment that the material is or is not relevant, and it is not a matter or law. Instead it is a typical low-order judgment that is *always* necessary to determine whether any report is or is not factual.[15] As

---

[15] It is interesting to note that some philosophers have given up on attempting to define fact in terms of physical or similar criteria. Instead they define a fact as a "true statement." Suzanne K. Langer states: "'Fact'....is that which we conceive to be the source and context of signs to which we react successfully....Science is an intellectual scheme for handling facts..." *Philosophy in a New Key* (New York: A Mentor Book, 1959), pp. 225, 232.

will be pointed out later the judge may have some "instructions" for determining the difference between sitting and reclining from the body of "legal" material that he is permitted to use. Such material may be available -- say from previous cases supplemented by acceptance of stare decisis -- and rules for its usage have probably been set forth. The judgment takes the form of establishing "similarity" between present and previous cases. If no such information is available the judgment is raw in the sense that it is made from criteria outside -- foreign to the legal profession. The point to be emphasized is that the relevance of facts, the materiality of facts, the competence of facts, all require judgment, but far too often it is forgotten that the very existence or non-existence of the facts requires judgment.

In view of the impossibility of having a perfect structure, the legal profession has done an excellent job of setting forth working rules (some of which are crude indeed) for getting facts and aiding judgment formation. The "best-foot-forward" bias of the advocate system is expected and discounted, and special less stringent rules are applied if a statement is "against interest." Certainly accountants may incorporate an explicit and more coherent recognition of the self-interest psychologies in setting up internal controls. While the rules of hearsay evidence may need modification before being applied to auditing, they may help establish a more sophisticated relationship between "all-ears" auditing and the well-established legal doctrine that all written documents "speak for themselves." Auditors are familiar with the doctrine of proof burden and the duty of the complaining party to keep the case going. Apparently the doctrine of "judicial notice" has an undeveloped counterpart in "audicial notice." Auditors may find use for the "presumption rules" of many jurisdictions, but three-way classification of none, prima facie, and conclusive may need considerable expansion and refinement before being directly useful for appraising auditing evidence.

What institutional machinery is currently available for reaching legal judgments? Put in another way, what criteria are used by judges for getting judgments? How are such criteria weighed? And how does the judge decide when the criteria are sufficient to support a decision? In a word, how are judges trained to judge? Answers to these questions may help the reader decide how auditors are taught to audit and how the accounting profession decides which behavior is acceptable and which must be rejected. Unfortunately the answers are at best partial and their transfer value may be overestimated.

Clearly the doctrine of stare decisis is a rule that is of some importance and is a devise that adds continuity to decisions by assuring that members of the profession follow a similar pattern of observing and weighing the past. The appeal to precedence requires that a careful record of past performance be available in usable form. Accounting does not have the advantage of a more or less complete history of past audits, but typically some previous audit papers and miscellaneous information are available. Various organizations have tried to generalize and to distill the more immediate and important experience into rules. In general the continuity of stare decisis and documented historical cases is replaced in accounting by the continuity provided by such rules, by

the tradition of textbooks, by auditing manuals and word-of-mouth instructions from senior members of accounting firms.

The basis for all judgment must be rooted in the past, but the decision to base judgments on formal precedence involves some unusual features. First, the decision to use precedence is itself based on prior judgments as to the desirability of continuity, uniformity, and predictability. The long discussions in legal literature with regard to *stare decisis* testify to the lack of unanimity about these objectives and the tremendous price that must be paid in the form of ponderous inflexibility. Acceptance of *stare decisis* also involves the judgment as to when, if ever, it may be desirable to depart from the rule. If some departure is sanctioned, how can it be done without wrecking the structure entirely? These problems are in turn related to the problem of balancing inflexibility with the need for a structure that will provide enough stability to permit predictions of the most common cases and to let most contestants know approximately where they stand. Criteria must also be developed so that decisions may be reached as to whether the case at bar is similar to those that have gone before. Perhaps the case method helps prepare lawyers for this duty. Finally, the changing statutes may help the cause of flexibility. To some extent under *stare decisis* the duty to provide flexibility is shifted to the legislative arm, but statutes, too, call for interpretation by the courts and here again judgment is required to steer through the wording and "intention" of the statutes.

Accountants are probably prepared to admit that the guideposts to help judges reach decisions are more definite than their counterparts in the accounting profession. The rules of evidence followed by a typical court may appear naive to philosophers, but they are operational in the sense that they can be applied and they are utilitarian in the sense that they expedite the legal process of fact finding and the process of judging the relative probability of conflicting contestants for the role of facts. Judges, like auditors, have the benefit of summaries, distillations, rules, conventions and principles, but judges have a somewhat better transcript of pertinent history than auditors. Judges have also the benefit of more numerous and detailed directives in the form of statutes and regulations set forth by others who have been designated by the electorate. Thus, they have available a reasonably current and *direct* set of partial objectives from the social body through its designated decision makers for each area. In other professions including accounting such objectives are not so clearly set forth. Accounting finds its clues from legislation, court decisions, administrative rulings, political statements, trade association requests, journal articles, text books, informal conferences and a host of other sources. Some have advocated an accounting court to serve as a mechanism for selecting, rejecting, and expanding accounting rules and to weigh the needs of contending groups. Others fear that the added inflexibility may stifle some of the vitality of a new profession.

BELIEF, EVIDENCE AND NATURE OF PROOF II

This essay is devoted to a general discussion of judgment in relation to evidence in a statistical sense and with the concept of proof as used by logicians and mathematicians. The tone of the discussion is non-technical and elementary, but an attempt is made to deal with theoretical points and to avoid the common tendency to "hide behind" techniques and complicated jargon. The field of statistics has been undergoing a period of tremendous change since approximately World War II. The literature is bulky and technical, and the reading is difficult. An attempt has been made to point up the issues that are relevant to accounting and to indicate the leaders in the field and their contributions. Little or nothing is said about the specific problems of applying sampling to auditing. Vance, Neter, Cyert and a small army of practitioners have been developing possibilities in this direction. The view here is that accounting itself is a combination of statistical methods and behavioral observations. Accordingly, interest is concentrated on a survey of statistical literature for help in judgment formation, inductive procedures and guides to inference. The expansions of semi-statistical attitudes in the area of decisions, expected value, utility assessment, etc., seem to have relevance and important applications to accounting. After all, the public accounting profession is based on the value of independent opinion and independent judgment. Members give explicit opinions on many aspects of activity, including management's intent, and implicitly they appraise and weigh the needs of different groups contending for specialized information and balance such needs against one another and with estimated costs of providing information. In the field of control they appraise aspirations, reactions to rewards and penalties, ethical climate, fear of rejection, reluctance to share guilt, and many other similar human reactions. How much control is needed? How much information? How often? For whom? The questions are seemingly endless. Our knowledge is pitiful.

Certainly the problems are not peculiar to the field of accounting, and they are not new.

> ...there was a rule in Athenian courts excluding hearsay evidence, on the ground of the general untrustworthiness of reported statements as compared with the evidence of eyewitnesses....Curious and distorted survivals...appear in...the Middle Ages. For example, two witnesses were required for a "full proof," while a doubtful witness counted for "less than half." The object apparently aimed at was to convert the process of rendering a decision into a calculation of the "resultant force" of the testimony submitted.[1]

---

[1] Ernest Nagel, "Principles of the Theory of Probability," Inter-

The transition from analytic or logical inference to the inference of conclusions from empirical facts is not an easy one. In fact there is a specious aspect to the drawing of conclusions from a formal set of premises with the rules of transformation given. "Mathematics," states Polya, "in the making appears as an experimental, inductive science."[2] Carnap also emphasizes that intuition and method are important in deductive logic.

> ...when a mathematician has found a theorem, he wants to give an exact proof for it so as to compel the assent of others. Finding a theorem is largely a matter of extrarational factors, not guided by rules....the rules of deduction are not rules of prescription, but rules of permission and of prohibition.[3]

---

national Encyclopedia of Unified Science (Chicago: University of Chicago Pres, 1955), p. 348.

[2] G. Polya, How to Solve It (New York: Doubleday Anchor Books, 1957), p. vii. The traditional distinction between analytic and synthetic statement is that predicates of analytic statements are repetitions of the subject, e.g., "A small man is small." Such statements are a priori in the sense that they are "true by definition" and not true by experience, e.g., "A dead zap is dead." In synthetic statements predicates are not a repetition of the subject. To determine whether this statement is true or false one must have experience and discrimination. Such proposition are known in classical philosophy as a posteriori propositions. Unfortunately the distinction is not always easy to make. The statement "Material bodies have weight," is clearly synthetic, for we have instructions in the form of operational rules that permit us to identify material bodies and to test them for the presence or absence of weight. Take, however, the expression: "Material bodies are extended." Perhaps this statement reduces to an equivalent analytic statement: "Extended bodies are extended."

[3] Rudolf Carnap, Logical Foundations of Probability (Chicago: University of Chicago Press, 1950), p. 195. He also emphasizes: "Scientists carry out their deductive inferences in most cases, especially where mathematical transformations are not yet involved, in an intuitive, instinctive way, that is, without the use of explicitly formulated rules of logic;....In other cases, the premises with which he works are so complex that he is either not able or not willing to take the trouble of formulating them explicitly and exhaustively..."Ibid., p. 242. Von Mises is not very charitable to those "...naive 'pure theoreticians,' in whose mind all of science dissolves into separate systems of tautological transformations..." Richard von Mises, Positivism: A Study in Human Understanding (Cambridge: Harvard University Press, 1951), p. 175.

In fact, much of what passes for mathematical proof is not logically rigorous in the sense that every step is outlined and the citation given to the appropriate logical rule of transformation. Suppes has emphasized that typically students of mathematics feel that they are not given adequate criteria for accepting or rejecting proofs and states.

> In an informal proof enough of the argument is stated to permit anyone conversant with the subject to follow the line of the thought with a relatively high degree of clarity and ease. It is presumably intuitively transparent how to fill in the logical lacunae in the proof....in giving an informal proof, we try to cover the essential, unfamiliar, unobvious steps and omit the trivial and routine inferences. However...the concepts of being essential, being unfamiliar, or being trivial are not precise...[4]

Now inference may be expanded to cover the process of transferring belief in a collection of premises to belief in the conclusion. Clearly we are in need of some method of identifying which of two beliefs is the stronger and, if possible, some method of measuring and marking how much stronger one is than the other. For it goes without saying that we do hold -- and should hold -- certain beliefs with more tenacity than others.

G. Polya has performed a service by emphasizing and defending the respectability of heuristic reasoning. The heuristic procedure consists of the study of how invention and discovery are carried on and therefore has strong psychological overtones. Heuristic reasoning "is not regarded as final and strict but as provisional and plausible only, whose purpose is to discover the solution of the present problem....What is bad is to mix up heuristic reasoning with rigorous proof."[5] Heuristic reasoning aims at being plausible and convincing, and often makes use of analogies with similar relations and tries to arrive at tentative conclusions that may later be subjected to more rigor. The form of heuristic syllogism illustrates the difficulties that have faced so many theorists and takes the form:

$$\begin{array}{c} \text{If A then B} \\ \text{B true} \\ \hline \text{A more credible.} \end{array}$$

We all would like to know just how much more credible A has become by virtue of B's being true, but this problem is extremely difficult and is reserved for discussion in connection with Bayesian statistics. Polya continue:

---

[4] Pattrick Suppes, Introduction to Logic (New York: D. Van Nostrand Company, Inc., 1957), p. 128. He adds: "As some psychologists would put it, in order to make the transition from formal derivations to informal proofs we must develop a tolerance for ambiguity." Ibid., p. 138.

[5] G. Polya, op. cit., p. 113.

> ...they do not have the certainty of a strict demonstration... they are useful in acquiring essentially new knowledge, and even indispensable to any not purely mathematical or logical knowledge ....The conclusion of the heuristic syllogism differs from the premises in its logical nature; it is more vague, not so sharp, less fully expressed. This conclusion is comparable to a force, has directon and magnitude. It pushes us in a certain direction: A become more credible....The direction is expressed and is implied by the premises, the magnitude is not.[6]

Let us now turn to the possibility of arranging strength of belief in some sort of order and perhaps applying an index of measurements to the results. The discussion begins with the more traditional view. Braithwaite, for example, feels that there is only a slight possibility of finding a useful ordering and is convinced that belief is an all-or-none phenomenon. He states:

> It is not a question of being more or less reasonable in adding H to his rational corpus....it is more reasonable to believe a hypothesis if it is supported by a greater amount of evidence of the same kind....belief is discarded at one blow; it does not fade out of the corpus by becoming less and less 'probable' until it falls below the 'probability threshold.' Similarly a belief is added at one blow; it does not fade in by becoming more and more 'probable' until it rises above the threshold. The notion of a scale of probabilities of a hypothesis with a corresponding scale of degrees of reasonableness of belief in the hypothesis is, I believe, a philosopher's myth.[7]

Braithwaite recognizes subjective considerations. "...although I am unable to recognize differences in the reasonableness of the beliefs which are in my rational corpus, I am able to recognize differences in the tenacity with which I hold them."[8] There are several serious objections to Braithwaite's views. First, he assumes without offering anything like either empirical or analytical proof that the corpus of rational belief is a go-no-go kind of thing with beliefs of various kinds not distinguishable on the base of reasonableness. 'Reasonableness' is, of course, a word used without instructions for identifying and scaling. Yet the recognition of the "tenacity with which I hold them" means that he feels that

---

[6] Ibid., pp. 186, 189.

[7] R. B. Braithwaite, Scientific Explanation (Cambridge: University Press, 1953), pp. 356, 357. "Can any satisfactory general criterion be given for arranging beliefs in scientific hypotheses in an order so that one can be said to more reasonable than another?....I do not believe that any criterion can be given for even a non-numerical comparison which is at all satisfactory." p. 355.

[8] Ibid., p. 359.

beliefs (at least~~s~~ within the corpus) can be discriminated and are probably scalable. We then ask what kinds of changes must be introduced in the evidence to change tenacity habits or to overcome the fixed amounts of tenacity in each case. Braithwaite does not discuss this matter fully although he points out: "Of course any particular set of highest level hypotheses may be held very tenaciously, being treated as 'functionally *a priori*' propositions...."[9]

Braithwaite asserts that there is no threshold for admission, and one is then forced to ask what are the determinants for admission? What exactly are the habit patterns that determine admission and non-admission or later rejection? What degree of confirmation is necessary? If every instance of experience tends to confirm a particular belief, we have one of the cruder ideas of causation. Ordinarily scientists do not insist on such a high degree of confirmation. Nagel, for example, points out: "A theory is not in general dismissed as false or worthless because the confirmation of its prediction by observation is only approximate -- even through formally every deviation from a predicted value of a magnitude is a negative instance for a theory."[10] Carnap has worked extensively with the possibilities for an inductive logic and with the nature of confirmation. For Carnap, inductive logic may be summarized: "Given: a sentence *e* as evidence; wanted: a hypothesis *h* which is highly confirmed by the evidence *e* and suitable for a certain purpose."[11]

The point that is most evident in the Braithwaite sense of being added to a mental corpus is that the concept is entirely psychological, and behavioral overtones simply cannot be avoided. One then asks, what are the psychological determinants for admission and rejection of attitudes? The question opens up the private-personal discussion of scientific method along with the possibilities for interpersonal comparisons. Inasmuch as auditing is a profession, and more specifically a profession that derives its revenue and excuse for being primarily from selling opinions (judgments and beliefs), we arrive at a "fundamental problem of auditing" -- how is opinion formed and how much evidence is necessary for a member of the profession to risk his reputation on its accuracy? (This presumably is equivalent to Braithwaite's admission to the mental corpus.) We have a related problem for the auditing profession in determining how the rules of evidence and the feel for the correct amount of evidence are to be disseminated and taught to new members so that the required degree of uniformity is procured. (These facets of the problems are treated elsewhere.)

---

[9] *Ibid.*, p. 359.

[10] *Ernest Nagel*, op. cit., p. 397.

[11] Rudolf Carnap, *op. cit.*, p. 194. Carnap distinguishes three levels of confirmation. "...(i) a *classificatory* concept of confirmation ('the hypothesis *h* is confirmed by the evidence of *e*'); (ii) a *comparative* concept of confirmation ('*h* is confirmed by *e* at least as highly as *h'* by *e' '*); (iii) a *quantitative* concept of confirmation, the concept of *degree* of confirmation ('*h* is confirmed by *e* to the degree *r*')." p. 163

Now the degree of evidence that will satisfy an individual and justify a conclusion is psychological, yet it does not follow that the auditing profession deals entirely with private opinions. The machinery for teaching, for determining the rules of procedure, and for setting the thresholds for admission to the mental corpus is determined by the leaders of the profession in response to what they believe to be social needs. All of this influence in training and other forms of indoctrination mean that the individual is so preconditioned that the results are perhaps more public than private.

Probability

It is important for non-specialists in statistics to realize that mathematicians try to develop a completely abstract set of primitive terms and to define the relationships and properties of all new terms admitted to the set. These relationships and properties are based on notions that are considered to be primitive. It is important that the terms have no "meaning" or interpretations except those given in the axioms regarding their relationship with other terms. The axiomatic system for probability could be developed and remained completely uninterpreted in the empirical world. The term later can be interpreted (connected to empirical data by rules of correspondence) in any way that does not violate its relation to the other terms after they too have been interpreted. While the construction of an abstract axiomatic system is rarely made without reference to some empirical data, it is important to remember that it could be so constructed. Such systems are often derived originally to "account for" some empirical data, but even so, alternate interpretations of the system are possible and are sometimes plentiful.

Inasmuch as words ordinarily have undesirable overtones, theorists often set up the system entirely with symbols. Suppes for example states:

> Our axiomatization of probability proceeds by defining the set-theoretical predicate 'is a finitely additive probability space'. The axioms are based on three primitive notions: a non-empty set X of possible outcomes, a family F of subsets of X...and a real-valued function P on F; for $E \in F$, $P(E)$ is interpreted as the probability of E.[12]

---

[12] Patrick Suppes, Introduction to Logic, op. cit., p. 274. Kolmogorov is usually credited with being the first to construct a rigorous axiomatic structure for probability using finite numbers. "In every situation ....there is an associated probability space or triple (Ω, ξ, p), where Ω is an abstract space.. ξ is a σ-algebra of subsets of Ω ...and $p'(E)$ is a measure...defined for $E \in \xi$, and satisfying the condition $p(\Omega) = 1$." Statement by A. T. Bharucha - Reid in bibliography for A. N. Kolmogorov, Foundations of the Theory of Probability (New York: Chelsea Publishing Company, 1950), p. 77, (Published originally in 1933).

Mathematicians have made tremendous strides toward generalizing the abstract structure of probability, but at the practical level applied statisticians have had difficulty agreeing on the most useful interpretations. It is with this area that accountants are most directly concerned. It should not come as a surprise that several interpretations are in use. Nagel states:

> "There are, in fact, three major interpretations of the term 'probable'. According to the first, a degree of probability measures our subjective expectation or strength of belief, and the calculus of probability is a branch of combinatorial analysis ....According to the second probability is a unique logical relation between propositions, analogous to the relation of deducibility; its most prominent contemporary supporter is the economist Keynes. According to the third, a degree of probability is the measure of the relative frequency with which a property occurs in a specified class of elements.[13]

Let us start with the early understanding of the term, which was associated with the problems of evidence and confirmation of belief, and is of special concern to the auditing profession. Carnap states: "... the term 'probability' was meant in the sense of 'evidential support for an assumption (or event)' or 'rational credibility of an assumption,' and, more specifically, as 'numerical degree of this support or credibility.'[14] De Morgan is reported to have said: "I consider the word probability as meaning the state of the mind with respect to an assertion, a coming event, or any other matter on which absolute knowledge does not exist."[15] Nagel devotes some time to discussing whether the degree of probability in the classical sense is based on what folks do believe or on what they ought to believe. Certainly finding a scale of belief that is common to everybody or even to one individual is a difficult ~~one~~ task. The classical solution, offered by Laplace and followed to some degree by Poisson, De Morgan, Boole and others, was based on the ability to analyze each possible occurence into a set of "equipossible alternatives." Once the probability space has been determined, the individual probability is found by dividing the number of favorable alternatives (presumably counted) by the total number of alternatives making up the set. Inasmuch as each alternative is "equipossible" the resulting fraction can be taken to be a measure of probability. One does not have to be a philosopher to feel that basing such a theory on the equipossibility of alternatives leaves something to be desired, although it may be possible to work out a practical guide for action on such a foundation. Does, for example, "equipossible" mean "equiprobable?" If so, the circularity is obvious to a certain degree, and the resulting foundation is not as firm as one would like. The circularity is not complete however, for it is possible to calculate "indifference" or "equal-deal" points in the manner of economists' indifference

---

[13] Ernest Nagel, op. cit., p. 360.

[14] Rudolf Carnap, op. cit., pp. 182 - 183.

[15] Quoted from Ernest Nagel, op. cit., p. 386.

points and to define new concepts that depend on this relationship. Thus we need not be too concerned with the charge of circularity. If there is available an operational set of rules for determining indifference and another set for combining them to form a construct, the term probability may be applied to the result.

Unfortunately, there are cases where it is difficult to resolve the alternatives into equipossible occurrences, e.g., a loaded die that has a larger possibility of turning an ace. The next step or extension is to follow the lead of Ramsey and set up operational rules for handling non-equipossible alternatives. How may this problem be approached? The Ramsey solution, and the solution that is now followed by Bayesian statisticians, is to measure the strength of belief by the size of the bets that someone would be willing to take, and to scale non-equipossible events in this fashion. The advantages of this system are clear enough, but unfortunately there are difficulties. Certainly, the amount of the bets that a person would make depends on a lot of things other than his feeling of relative expected frequency, but there is no inherent need to identify probability with relative frequency. The assessment is subjective, and there is no implication that the betting odds will scale linearly with individual estimates of frequency or that money should scale linearly with sacrifice.[16]

Nagel also points out that to assume that a probability ratio made up of these "equipossible" cases is related to the frequency with which they do in fact fall is unwarranted. He points out that the definition is a priori and that the actual frequencies are synthetic and a posteriori. In order to set "equipossibilities" and assess utility, one may have a convincing model or only information of the vaguest sort. One may ask whether the operational instructions (methodology) for finding the total possibilities of the set and weighting them will tend to establish some relation between the probabilities and the actual occurrences. Those who do poorly -- apply the operational instructions poorly -- become losers and may be weeded from the betting fraternity. This argument is hardly persuasive. It may also be asked whether there need be any necessary connection between strength of belief before an occurrence and the frequency of the actual occurrence. A close relationship is not essential, but one's subjective weights are influenced by knowledge of analogous physical models or past frequencies.

There is no question of the desirability of having a measure of the "degree of confirmation" or of the "weight of evidence." Whether this kind of thing is called logic or probability is not important so long as the facets of the problem are brought to light. Exactly what operational rules should be followed in testing the degree of confirmation of any theory or proposition? The truth or falsity of a theory or proposition can never be established with a finite number of positive instances.

---

[16] Carnap has again treated this topic in a thorough and competent manner. See op. cit., pp. 252ff. See also Harry V. Roberts, Statistical Inference and Decision (Lithoprinted, Chicago: By the author, 1960), Chaps. 1, 2, 3, and Robert Schalifer, Probability and Statistics for Business Decisions (New York: McGraw Hill, Book Company, Inc., 1959), Chap. 2.

One negative instance is sometimes supposed to "disprove" a theory, but variations and the possibility of poor measurement or contributing but unidentified factors mean that rarely is a theory abandoned because of a relatively few negative instances. In fact, this position is carried to an extreme at times by maintaining the anti-rational position that "exceptions prove the rule." Nagel wonders why one feels more secure when several samples show a high degree of stability under repeated sampling. The answer is, of course, psychological and is essentially an appeal to experience.

> A theory is "better established" when we increase the number and kinds of its positive instances, because the *method* we thereby employ is one which our general experience confirms as leading to conclusions which are, stable or which provide satisfactory solutions to the specific problems of inquiry....As Peirce succinctly put the matter, "Synthetic inferences are founded upon the classification of facts, not according to their characters, but *according to the manner of obtaining them.* Its rule is that a number of facts obtained in a given way will in general more or less resemble other facts obtained in the same way; or...."A degree of confirmation is thus a rough indication of the extent to which our general *method of procedure* has been put into operation.[17]

Perhaps the most widely held empirical interpretation of probability is in terms of relative frequencies. The frequency approach has strong appeal to those with bias for the scientific approach. In the early days of worrying about the nature of probability, a distinction was made between probabilities *a priori* and probabilities *a posteriori*. In Carnap's words:

> If the evidence...said only that the die had the shape of a regular cube, the statement would be said to give a probability *a priori*. If, on the other hand, the evidence described the results of six thousand throws made with the die and stated that one thousand of them were aces, the probability was called *a posteriori*.[18]

From the viewpoint of some theories of knowledge there does not seem to be very much difference between the two. The relative frequency method is usually identified with the latter approach. It requires no previous knowledge of the shape of the die (no physical model), for it is concerned only with the historical results that have been recorded and with the additional very important requirement that probability be interpreted and defined as the limiting value of the relative frequency of an event in the long run.[19] In one sense the *a priori* approach requires a theory in

---

[17] Ernest Nagel, *op. cit.*, p. 414. (Italics in original.)

[18] Rudolf Carnap, *op. cit.*, p. 188. The former case is based on experience with a physical model; the second case is sometimes called 'empirical.'

[19] "*As a basis of an exact theory of repeated events and mass phenomena one may choose a probability concept defined as the limiting value*

simple form. Past experience has been gathered with regard to the behavior of aces when a symmetrical die is cast. This experience has provided, or someone's intuition has developed, information that such a cube should fall with a given side up 1/6 of the time. It is possible in simple cases, like a coin, to use intuition in the sense of recalling behavior of similar objects and concluding that the longrun frequencies should be 1/2. That is to say, we normally look for evidence (often a physical model or analogy) over and above a record of past frequencies. Researchers feel more confident (feel that the relationship is not "spurious") if they have independent criteria that tend to support the conclusion without counting frequencies or observing correlations. The relative frequency approach does not rule out supplementary devices that will help us find the limiting values or to "intuit" them, but it holds that such supplementary support is not necessary for a concept of probability. The following summary of the relative-frequency position is from Nagel.

> a) No meaning can be attached to any expression which, taken literally, assigns a probability to a single individual as having a specified property....
> b) Every probability statement...is a factual statement, into whose determination empirical investigations of some sort must always enter,...they are not formulations of the degree of our ignorance or uncertainty. To assert...the probability of a normal coin...is 1/2, is to ascribe a physical property to a coin....
> c) Since the explicit definition of probability statements is in terms of relative frequencies, the _direct_ evidence for them is of a statistical nature....
> d) Since a probability has been defined as the limit of a relative frequency...(in the long run), every probability statement is a hypothesis; such a hypothesis cannot be completely confirmed or finally verified by the (necessarily) finite amount of evidence actually at hand at any given time....they cannot even be completely disconfirmed by any actual evidence....
> d) ...It is perhaps sufficient to note that the use of probability statements requires no commitment, even by implication, to any wholesale "deterministic" or "indeterministic" world-view..."[20]

It should be quite clear that many problems cannot be answered in the framework of the frequency approach to probability, for there are many questions of judgment and belief about which there is no body of data that remotely approaches a frequency collection. Such an approach is simply inadequate for modern decision theory, for example, because decisions worthy of attention are _not_ precisely like _any_ previous decision. If,

---

of the relative frequency of an event in a sequence of trials continued indefinitely." (All italics in original) Richard von Mises, _Positivism: A Study in Human Understanding_ (Cambridge: Harvard University Press, 1951), p. 169.

[20] Ernest Nagel, _op. cit._, pp. 365-366.

however, it is known that in the past one of one thousand dies within the year. One may be entitled to the further assumption that this figure is a tentative limiting factor and should continue to hold for an indefinite number of years -- over the longrun. Such statements depend on past factual experience and an assumption about the future. Even if the assumption is granted, it still may be impossible in many cases to accumulate the necessary evidence to aid our intuition in seeking for the long-run limiting value. From a methodological viewpoint, it may be argued that the concept of limit assumes an ordering in time or at least of successive tries, and when taken with the impossibility of ever proving or disproving such an assumption with a finite number of tries, the ordering assumption may prove to be distasteful, for it is an assumption that is synthetic in nature. Carnap states:

> Statements...which assert success in the long run for the inductive method would be true if the world as a whole had a certain character of uniformity to the effect, roughly speaking, that a kind of events which have occurred in the past very frequently under certain conditions will under the same conditions occur very frequently in the future....There is no doubt that the principle is synthetic....any attempt to confirm inductively the principle of uniformity would contain a vicious circle....Other philosophers maintain that we must abandon the principle of empiricism which says that a synthetic statement can be accepted only if it is empirically confirmed.[21]

It is now generally admitted that the frequency concept of probability cannot answer all questions containing the term 'probable.' How shall we evaluate such statements as: it is probably true that Lincoln visited the town of Blacksville? Such a question cannot be answered by holding that it is elliptic and therefore a part of a more complete formulation. The evidence can be weighed in the sense that information that seems relevant may be marshalled and arrayed, but this kind of evidence is not in the form of frequencies and cannot be put into such forms. Nagel emphasizes that the frequency viewpoint with its associated probability calculus cannot answer all types of problems of induction and inverse probabilities.

> A common objection to the frequency theory of probability is that, although probability statements concerning single occasions or single propositions are often asserted and debated, it is meaningless to assert such statements in terms of the frequency theory....Frequentists have retorted, quite rightly, that such statements are without meaning, if they literally attribute a probability in the frequency sense to a single proposition...[22]

Perhaps the most interesting criticism of the frequency theory of probability involves the argument that it confuses the evidence (subject matter) with the concept. This view is held by Carnap.

---

[21] Rudolf Carnap, op. cit., pp. 178, 179.

[22] Ernest Nagel, op. cit., pp. 402 - 403.

> ...the frequency statement is not a premise of the probability statement but part of its subject matter, and hence the customary phrase 'derived from frequencies' is misleading. It would be more correct to say that in these cases the probability is determined with the help of a given frequency and its value is either equal or close to that of the frequency.[23]

It is of the same order of argument to assert that our knowledge of the design of a die or a coin makes up the concept of probability. Unfortunately elementary business statistic books sometimes convey this impression.

Some variation of the subjective approach to probability has been introduced by Keynes.[24] Probability according to this view is not interpreted as some scale of subjective expectations, and there can be no such thing as the probability of a single proposition. Probability is defined as a relation between propositions of which one is the conclusion and the other or others are propositions setting forth the evidence. The relationship is held to be beyond the capacity of analysis, and the "logical distance" is held not to be subject to scaling and measurement. In fact, it is highly doubtful if probability in this sense is capable of being ordered.[25]

Let us now turn for a very brief look at the modern subjective interpretation ~~to~~ of probability that has had so much influence in recent decision theory and promises fruitful extensions in the field of accounting. A type of belief or confidence index may be established and scaled according to willingness to bet variable sums, and the results may be interpreted as a measure of subjective probability. Braithwaite holds essentially this view.

> ...a scheme of hypothetical generalized betting can be devised which will enable degrees of belief to be measured....there is no objective empirical probability with which the degree of his belief ought to correspond....Since betting odds can be attached to the possibility of changes in my rational corpus these will serve to define a subjective sense of "probability" (if we choose to give it that name)...[26]

---

[23] Rudolf Carnap, *op. cit.*, p. 188.

[24] J. M. Keynes, *A Treatise on Probability* (London: Macmillan and Co., Ltd., 1921).

[25] Braithwaite, who dedicates his book to Keynes, agrees on this point. "Can any satisfactory general criterion be given for arranging beliefs in scientific hypotheses in an order so that one can be said to be more reasonable than another? ....I do not believe that any criterion can be given for even a non-numerical comparison which is at all satisfactory." *Op. cit.*, p. 355.

[26] R. B. Braithwaite, *op. cit.*, pp. 358-359. The acknowledged treatise on *subjective* probability and its axiomatic basis is: L. J. Savage, *The Foundations of Statistics* (New York: John Wiley & Sons, Inc., 1954).

J. Neyman, R. A. Fisher and others have done some effective work along these lines, but have been careful to distinguish "measures of credibility" from probabilities. Carefully worked out rules have been devised for assigning values which must meet stability standards when subjected to repeated samplings. If the process is to be employed for decisions even this sort of stability is not essential but some sort of consistency of actions with goals may be implied and some sort of cost structure must be added.

It is clear that the purpose of attempting to identify and measure strength of belief is to help someone make decisions. These decisions usually take the form of selecting one hypothesis or one course of action over another or others. For this kind of problem, whether or not the process is known as probability and regardless of the particular decision rule, the assignment of values cannot be avoided. Carnap comes to this conclusion and devotes considerable time to the considerations to be given weight in setting relative value. His position seems to anticipate the expected value of some current Bayesians, but his decision rule is only one among many possible rules.[27]

Braithwaite comes to a similar position that: "...depends essentially upon regarding belief in a hypothesis as having desirable effects if the hypothesis believed is true and undesirable effects if the hypothesis believed is false."[28] This too is the position of quality control statisticians and auditors. The consequences of accepting a document as valid when in fact it is a forgery may have variable consequences, and they may be important or relatively unimportant. The cost of rejecting a procedure or document that is in fact good is ordinarily of less consequence but the values change in different circumstances. Perhaps the chief merit of modern methods of statistics in accounting is that they force auditors to face up to the chances they are willing to take of an unwise acceptance or an unfair rejection. Furthermore, auditors are forced to appraise the relative importance of different errors and weight them in some sort of subjective decision scheme. By so doing, auditors organize their thinking and by making use of intellectual advances in

---

[27] Rudolf Carnap, *op. cit.*, p. 264. "...the following rule... 'Choose that action for which the estimate of the resulting utility has its maximum.' The use of this rule presupposes that utility can be measured and that there is a quantitative law stating the utility as a function of the gain."

[28] R. B. Braithwaite, *op. cit.*, p. 201. He continues: "The choice is to be determined by a comparison of the desirable effects of believing one hypothesis if it is true and the undesirable effects of believing the other hypothesis if it is true or false. Thus notions of measurable *value* cannot be avoided....The gains and losses considered may be quantities of happiness, or quantities of eudaemonia, or of joy, or of absolute goodness; there is no need for the logician in devising a choice-policy to settle any ethical question as to the nature of the ultimately desirable things." *Loc. cit.*

sister professions, they are permitted to concentrate on a smaller area of investigation where their competence is better established.

Digression on Logical and Mathematical Proof

It may be worthwhile for some accountants to observe how logical and mathematical proofs are developed. The following discussion is extremely elementary and sketchy, but it may help arouse interest in the topic and encourage some readers to turn to the standard works in the field. Careful study of the mathematical process is ordinarily profitable, and with the extension of computers and mathematical models the process promises to become an increasingly important part of an accountant's training.

A brief discussion of the accepted laws of sentential calculus is followed by some comments on the rules of logical inference and the combination of these laws and rules to develop analytical proof. In passing, some points of controversy among logicians and mathematicians will be mentioned. In spite of similarities in training and knowledge some mathematicians are "convinced" relatively easy while others insist on more difficult standards of rigor.

The following "laws" of logic are relatively simple and are familiar and acceptable to most accountants.

1. (Identity) If p then p.
2. (Simplification for addition) If p then q or p.
3. (Simplification for multiplication) If p implies q and q implies p, then p if, and only if, q.
4. (Hypothetical syllogism) If p implies q and q implies r, then p implies r.

The laws below may not be so clear.

5. (Contradiction) Both p and not p are not compatible, i.e., $\sim [p \wedge (\sim p)]$. The symbolism is read: It is false that p and not p. The wave $\sim$ means not or "it is false that."
6. (Excluded middle) Everything must be p or not p., i.e., $p \vee (\sim p)$. The wedge indicates 'or' and the expression may be read: Either p or not p.
7. (Double negation) If not p is false, then p., i.e., $[\sim(\sim p)] \longleftrightarrow p$.
8. (Tautologies) (a) p and p if, and only if p., i.e., $(p \wedge p) \longleftrightarrow p$.
   (b) p or p if, and only if p., i.e., $(p \vee p) \longleftrightarrow p$.

9. (Cummutativity) Except in rare logical or algebraic systems it is assumed that p and q is equivalent to q and p, and that p or q is equivalent to q or p. Thus: $p \wedge q \Longleftrightarrow q \wedge p$, and $p \vee q \Longleftrightarrow q \vee p$.

10. (Associativity) The associative law for multiplication (a) and addition (b) is usually assumed.

(a) $[p \wedge (q \wedge r)] \Longleftrightarrow [(p \wedge q) \wedge r]$

(b) $[p \vee (q \vee r)] \Longleftrightarrow [(p \vee q) \vee r]$

Particular care should be taken with the use of "implies" or "follows" in logical proof, and as will be pointed out later there is some disagreement among logicians themselves. The logical usage has a conventional and somewhat specialized meaning. By agreement an implication is true in all cases except one: It cannot be that the first part (antecedent or hypothesis) is true and the second part (consequence or argument) is false. All other truth possibilities make the implication true. For example, the implication: "If an object is tangible, then it is an asset" is true if the particular object is or is not tangible and whether it is or is not in fact an asset. It is a false implication only if the item is tangible and is not an asset. Strange conclusions -- at least to a non-logician -- may be derived. Witness the following adapted from Tarski:

> "If p is true then p follows from any q...a true sentence follows from every sentence;
>
> if p is false, then p implies any q...a false sentence implies every sentence;
>
> for any p and q, either p implies q or q implies p...at least one of any two sentences implies the others."

The point to be emphasized is that the very apparatus of logic itself is not at all self evident. Logicians themselves have felt uneasy about the nature of the above "formal" implication, and alternative formulation have been advanced by Lewis, Keynes and others.[29]

The definition of some further relations may help one understand the procedure for grinding out logical and mathematical proof.

Converse. The converse of $p \rightarrow q$ is $q \rightarrow p$. The converse of "all assets are services to be received" is "all services to be received are assets!" We can see immediately that the truth of statement does not assure the truth of its converse. The truth of the sentence "factory labor is a production cost" does not establish the truth of the statement "production cost is factory labor." "All girls are females" does not imply that "all females are girls."

---

[29] For brief summaries of alternative meanings for implication see: Raymond L. Wilder, Introduction to The Foundations of Mathematics (New York: John Wiley & Sons, Inc., 1952), pp. 213-214.

Inverse. The inverse is formed by negating both the hypothesis and the argument of an implication. In symbolic terms the inverse of $p \rightarrow q$ is $\sim p \rightarrow \sim q$. Again the truth of a sentence does not guarantee the truth of its inverse. The admission that "bookkeeping is accounting" does not establish the truth of the converse "that which is not bookkeeping is not accounting." The inversion in this case is obviously false, but some inversions do happen to be true when the original implication is true.

Contrapositive. The contrapositive is formed by replacing the hypothesis by the argument as in the converse and then negating each part. The contrapositive is the inverse of the converse, and for the original statement $p \rightarrow q$ the contrapositive is $\sim q \rightarrow \sim p$. Now it can be established (shown, proved, made believable) that whenever a sentence is true its contrapositive is also true. For example:

> Statement: "Labor cost is factory cost." (true)
> Contrapositive: "That which is not factory cost is not labor cost." (true)

Perhaps the greatest advantage and worth of the formulation of formal or general rules of logic and mathematics is illustrated here. Once it has been shown that the truth of any implication implies the truth of its contrapositive, this rule may be applied to any particular statement or "interpretation." If contrapositive is formed correctly, we are assured that the implication of the contrapositive is valid without any further proof. If the reader has wondered why it is that mathematicians and logicians are so intent on establishing the generality of their procedures and relationships, the relationship of an implication and its contrapositive and the resulting economy of intellectual effort should put his mind at ease.

Before turning to other matters it is interesting and useful to observe that the inverse is in fact the contrapositive of the converse. Now if the converse is established, the inverse can be asserted without further proof. This statement assumes that the reader is satisfied with the evidence logicians advance to support the truth of the relationships between the original implication, its contrapositive, and the converse and the inverse. The laws of logic themselves must be satisfying, although sometimes the relationships are so complicated that the reader is sometimes convinced by faith. For most folks, however, the establishment of the truth of a sentence and its converse by independent proofs will be sufficient to establish the truth of the inverse and the contrapositive.

In addition to the so-called laws of logic there are rules of inference of which the rule of substitution and the rule of detachment are the most familiar. In logic equality is more rigid than in common usage. "A equals B" means that A is another name for B, i.e., that everything that is asserted about A may be asserted about B. The common usage in the sense of a pile A is equal in weight to pile B is a special meaning that is applied when the universe has been limited to matters of weight. Also the expression 'variable' in logic and mathematics is used in the broad sense of a "place holder." The statement "x is green" contains a

variable x and the sentential or propositional function is not true or false until the identity of the variable x is specified.

The Rule of Substitution is a method of getting new statements from old ones by substituting for the existing variables either new variables, equals, or concrete interpretations of the variables. The Rule of detachment (Modus Ponens Rule) has been stated by Tarski:

> ...if two sentences are accepted as true, of which one has the form of an implication while the other is the antecedent [hypothesis] of this implication, then that sentence may also be recognized as true which forms the consequent [argument] of the implication.[30]

We are now in a position to see how a formal deductive or axiomatic system works. Undefined terms must be agreed on in order to avoid the circularity of an infinite regress that comes inevitably from attempting to define everything. In the abstract -- in the most general expression -- these terms may be completely devoid of meaning, but for an "interpretation" of the abstract system it is necessary to have some intuitive knowledge of these undefined items -- something must be known about the undefined terms. This intuitive flavor of semi-definition of undefined terms before an interpretation can get off the ground seems to be an intuitive oasis in a veritable desert of rigor. If for example "asset" is an undefined term of an accounting interpretation, we must know enough about "asset" to use it in the system without being allowed to define it in the language of the system. The second requirement of a deductive system calls for axioms. These axioms are unproved propositions that in an abstract system may be picked at random but in an interpreted system are formulated from experience and concern the permissible behavior of the undefined terms. Needless to say, the selection of a set of axioms for a field such as accounting may require a considerable knowledge of the behavior of the field, and it is easy to understand why the generalized system in practice so often follows years or even centuries of practical knowledge. Theorems -- propositions that have been proved with the aid of axioms, undefined terms, and the rules of logic -- are often called the "theory" of the abstract system. Inasmuch as the truth or validity of the theorems has already been admitted, they can be used to develop further theorems without the need for going back to the primitive elements each time.

The development of an abstract system has often been compared to playing a game. The cards and their behavior are accepted and the rules of logic make up the rules for playing the game. The interpretation of the formal system in terms of accounting is treated in some detail in another essay, but in passing it should be pointed out that if Mattessich and others are successful in fitting the objectives of accounting into an axiomatic framework and employing the methods of logic and algebra, many

---

[30] Alfred Tarski, Introduction to Logic (New York: Oxford University Press, 1941), p. 48.

implications that are not now suspected may be brought to light. For example, if it can be established that accounting or any portion of it meets, say, the definition of a mathematical group, immediately all the previously developed or proved theorems that apply to group theory must be true also for the "interpretation in accounting." These formal theorems then become a part of the "theory," and the resulting statements in terms of accounting, mechanics, geometry, physics or even the number system itself are known as proofs by interpretation.[31]

Let us turn to proof in formal systems. The laws and rules of logic are applied to the axioms so that new propositions are established or proved. These new propositions -- theorems -- are then added to the undefined terms, axioms, defined terms and previously established theorems to increase the body of theory. But the reader may be impatient with generalities and ask how propositions are proved. Proof may take on many variations but here it may be sufficient to illustrate briefly the methods employed in direct and indirect approaches.

In order to prove that $x \rightarrow y$ we may start in a direct fashion to examine all the body of theory that is available. Perhaps in the pool of admissable theorems we can find that $x = y$, i.e., x is another name for y. In this case, we can substitute y for x and derive $y \rightarrow y$, and then apply the law of identity. Perhaps instead we find in the bag of existing information that $\sim(\sim x) \rightarrow y$. In this case we can apply the rule of double negation to establish the original statement. On the other hand, we may already know that $\sim y \rightarrow \sim x$. By the rule of contraposition we immediately know that $x \rightarrow y$.

For a slightly more complicated case suppose that we have been convinced by previous proofs that $x \rightarrow z$ and also that $z \rightarrow y$. Now suppose that x is valid, then the rule of detachment tells us that z must be valid. Now acceptance of the validity of z forces us by the rule of detachment to accept the validity of y. Thus if we accept x as valid and accept the laws of logic, we are forced to the conclusion that y is valid. It should be noticed that the rule of the syllogism may be accepted directly. Thus $[(x \rightarrow z) \text{ and } (z \rightarrow y)] \rightarrow (x \rightarrow y)$ can be applied. The validity of the hypothesis (antecedent) by a single use of the law of detachment assures the validity of the conclusion (consequence).

The indirect method of proof has several variations, but it starts with the negation of the conclusion. Again it may be possible to find previous axioms or theorems that show $x \rightarrow \sim y$. In this case the law of the unexcluded middle indicates that $x \rightarrow y$ cannot possibly be valid. Instead it may be possible to ascertain that $\sim y \rightarrow \sim x$. Now the contrapositive rule states $[(\sim y) \rightarrow (\sim x)] \rightarrow (x \rightarrow y)$. We have found that if the antecedent is valid the detachment rule assures the validity of $(x \rightarrow y)$. In other cases the denial of the conclusion may lead to the denial of the hypothesis (as above) or to the denial of itself or of theorems previously proved or even of axioms.

---

[31] See Ibid., pp. 117 ff.

Suppose for a more complicated illustration that we have accepted the mechanics of logic and wish to prove the following theorem in accounting: If cash is an asset, it cannot be worthless. We shall adopt only these three axioms:

(1) Cash is the asset in this instance.
(2) If the asset in this instance is an asset, it has value.
(3) If the asset in this instance is worthless, then it does not have value.

It should be noted that symbols are not necessary to demonstrate the proof, but, as usual, symbols tend to simplify the demonstration by emphasizing the formal relationships. Application of the rule of substitution permits us to substitute the identity of cash for "the asset in this instance" in axioms (2) and (3). Now denote:

"Cash is an asset" by a,
"Cash has value" by b,
"Cash is worthless" by c.

With these symbols the theorem to be proved becomes $a \rightarrow \sim c$. Axiom (2) becomes $a \rightarrow b$, and Axiom (3) becomes $c \rightarrow \sim b$.

The direct proof proceeds as follows. Assume the validity of the hypothesis (antecedent) a of the theorem to be proved. Then from (2) $a \rightarrow b$ is valid and by detachment b is valid. Now (3) states that $c \rightarrow \sim b$ is valid, and the law of contraposition shows that
$[c \rightarrow (\sim b)] \longrightarrow \{[\sim(\sim b)] \longrightarrow (\sim c)\}$.
Therefore by detachment we must accept the consequent, i.e., $[\sim(\sim b) \rightarrow (\sim c)$
But the rule for double negation lets us substitute b for $\sim(\sim b)$, so we may write $b \rightarrow \sim c$. At this stage we have shown that b is valid and that $b \rightarrow \sim c$ is valid, so that the rule of detachment will assure us that $\sim c$ is valid. The theorem is thus proved. for we have shown that if a is valid, then $\sim c$ must also be valid. In words: if cash is an asset, it cannot be worthless.

The theorem can also be proved by indirect methods. Remember that in symbolic terms the theorem becomes $a \rightarrow \sim c$; axiom (1) becomes $a \rightarrow b$; and axiom (3) becomes $c \rightarrow \sim b$. An indirect proof begins by an assumption that the consequence is false, and therefore we replace $\sim(c)$ by $\sim(\sim c)$. But the rule of negation lets us write c for $\sim(\sim c)$. Axiom (3) then becomes by this substitution $\sim(\sim c) \longrightarrow \sim b$. We assume the validity of $\sim(\sim c)$ and by detachment $\sim b$ is valid. We now turn to axiom (2) and apply the rule of contraposition to get $(a \longrightarrow b) \longrightarrow [(\sim b) \longrightarrow (\sim a)]$. Now axiom (2) assures us that the hypothesis is valid, therefore by detachment we are assured that $(\sim b) \longrightarrow (\sim a)$ is valid. We have already established the validity of $\sim b$ so by detachment again we know that $(\sim a)$ is valid. At this point we have established that $[\sim(\sim c) \rightarrow (\sim a)$ is valid. The final step is to apply the rule of contraposition to yield
$\{[\sim(\sim c)] \Longrightarrow (\sim a) \longrightarrow (a \rightarrow \sim c)$ and the theorem is proved.

It should be emphasized that these proofs could be established without symbolism, but they are considerably more difficult to follow or to construct. The machinery of symbolic logic is available to all who wish to make use of it, and to fail to utilize it is a waste of valuable intellectual resources. In a similar fashion mathematics has a tremendous arsenal of specialized resources that is available for use by anyone who can profit by their use. Moreover, if our needs as accountants are so specialized that existing logical and mathematical tools are inadequate, accountants along with professionals in logic and mathematics are free to develop new procedures and methods that may be applied. Within recent years the methods of matrices and groups have been applied to and even expanded for the social sciences. Accountants have been a little backward about applying modern methods to their problems. Our mathematics has been confined to the simplest operations of arithmetic and algebra, and our definitions have not been sharp enough to utilize the more powerful logical weapons.

The accountant who reads this material may have inferred that there is considerable lack of agreement among logicians. The intuitionist school, for example, accepts the usual meaning of contradiction in the sense that any statement that implies contradiction has to be false, but the intuitionist does not accept the law of excluded middle with its necessary consequence that the falsity of a false statement must imply its truthfulness. For an example consider the following statement from Wilder.

> There exists a natural number having property P...one may resort to the device of showing that the assumption of non-existence of such a number leads to contradiction and concluding that one has thereby proved the theorem. The intuitionist would not accept such a "proof" as this...Proof -- by exhibition of a number with the desired property P --- is of the constructive character demanded by the intuitionist....This does not involve a use of the Law of the Excluded Middle, however, nor its corollary that the falsity of the falsity of a proposition p implies p![32]

---

[32] Raymond L. Wilder, op. cit., pp. 243 - 244. Wilder points out that L. E. J. Brouwer is considered to be the leader of the intuitionist school, although many of the ideas go back to Kronecker. Brouwer's intuitionism must of course reject such non-intuitive concepts as infinity so that a good part of mathematics does not meet his test for proof. It is also interesting to note that mathematics is divorced from the "social consensus" assumption and is at least partially divorced from logic. Wilder (p. 233) states: "....it intuitionism recognizes the ability of the individual person to perform a series of mental acts consisting of a first act, then another and so on endlessly....This operation is not dependent upon the use of a language...mathematics is basically independent of language. For the communication of mathematics the usual symbolic devices, including ordinary language, are necessary, but this is their only function. This seems to make of mathematics virtually an individual affair rather than an organized or cultural phenomenon."

While the attitude taken here is that proof is a relation of statements to psychological attitudes, a modified approach is sometimes used and in fact has some advantages for abstract argument. This concept of proof is highly mechanical and is stated by Carnap as follows.

> By a proof in L we understand not a train of thoughts of a particular kind, but a sequence of sentences of L which in a certain sense corresponds to such a train of thoughts. The correctness of a given step from the preceding sentences of such a sequence to some subsequent sentence thereof is not tested on the ground that it is a more or less plausible inference in the train of thought, but rather on the ground that it does or does not conform to the transformation rules for L....a proof in L is a (finite) sequence of sentences of L, each of which is either a primitive sentence or a definition, or else is directly derivable from sentences preceding it in the sequence....If the negation of a sentence is provable in L, we say the sentence itself is refutable in L.[33]

At first glance this approach to proof seems to be entirely different from the essentially psychological approach used in this essay. The difference turns out to be less dramatic. A proof in the above sense is defined in terms of the rules of transformation, but how are the rules of transformation determined and when do they apply? These rules are determined by those who make use of the language and are in fact constructed with an eye to their ability to satisfy the needs of those who make use of the abstract language of logic -- to satisfy those who must interpret the language in the semantic sense. The plausibility of the proof, to Carnap, apparently is shifted to the plausibility of the transformation rules, and one is then not concerned with the intuitive plausibility of the intermediate statements.[34] The advantage and economies of being convinced that the "tools" and "processes" are satisfactory so that inter-

---

[33] Rudolf Carnap, Introduction to Symbolic Logic and Its Applications (New York: Dover Publications, Inc., 1958), p. 90. Notice the necessity for "preceding" and the implied ordering. A similar approach to the meaning of "fact" attempts to play down psychological overtones.

[34] Ibid., pp. 85, 86. "They [the rules of transformation] consist of rules specifying primitive sentences and rules of inference.... Our choice of primitive sentences and rules of inference will turn out to square with the interpretation we intend to make...." That Carnap is aware of the psychological overtones of logic is well understood. For example: "Though logic cannot lead us to anything new in the logical sense, it may well lead to something new in the psychological sense. Because of limitations on man's psychological abilities, the discovery of a sentence that is L-true or of a relation of L-implication is often an important cognition. But this cognition is not a factual one, and is not an insight into the state of the world; rather, it is a clarification of logical relations subsisting between concepts..." pp. 21-22.

mediate results need not square with our ideas of plausibility at every step are certainly obvious. In fact, in some complicated relationships in physics and elsewhere it may be impossible at our present stage of development to give any meaningful interpretation to correspond with the intermediate steps other than to know that the steps were made according to the rules of inference and are therefore valid according to those rules.[35] One's confidence in the results -- the plausibility of the results -- depends then on his confidence in his calculus (language) and in the feeling that his interpretation (semantics) is a proper one.

Carnap makes a distinction between proofs and de~~vi~~rivations. The degree of difference does not seem to be great, but the difference in import is considerable. Essentially derivations are proofs, but the proofs are derived from sentences which themselves may or may not be provable or even true. These sentences are called "premises" and may be added to the primitive terms and rules of inference, e.g., the logical and semantical apparatus. Clearly we can conclude that the conclusions are true only if the premises are true, and the confidence in the conclusions will normally be no greater than the confidence in the premises.[36]

A number of social scientists (and at least one recent accountant) have been strongly influenced by Hegel's so-called dialectic method as a substitute for logic. To the extent that this approach calls attention to the interconnectivity of all events it has holistic overtones. But as Hook points out the effects are not very startling unless the method helps us determine how they are related and "what kind of interrelation is meant."[37]

The Hegelian doctrine of polar opposites appears to be a poorly defined substitute for negation. Instead of using "tin cans" and "not tin cans" we find ourselves looking for the "polar opposite" of tin cans. What is the "opposite of" automobile? A star? Accounting? A debit? Does, as Hook suggests, the polar-opposite approach mean only that there are differences in data or experiences that can be isolated? This conclusion is trivial. Hook concludes: "...the dialectic method applies

---

[35] R.G.D. Allen states: "A mathematical proof may be quite incapable of 'translation' though the premises from which it starts and the consequences reached can be, and should be, put in 'literary' form." Mathematical Economics (London: Macmillan Co. Ltd., 1956), p. xv. This statement technically does not deal with the relationship of sentences to empirical data. Allen is comparing two languages.

[36] Carnap, op. cit., p. 92.

[37] Sidney Hook, Reason, Social Myths and Democracy (New York: The Humanities Press, 1950), Chap. 9. Reprinted as "Dialectic and Nature," Readings in Philosophy of Science, ed. Philip P. Wiener (New York: Charles Scribner's Sons, 1958), p. 373.

to situations where no hard and fast lines can be drawn, where areas of indetermination, critical phases and twilight zones are present."[38]

---

[38] Ibid., p. 368. All admit that such zones exist, but most of us feel that the newer probabilistic approach has infinitely more to offer. It is interesting to note that Hegel, himself, did not fall into the trap of considering all knowledge a closed system. He recognized "relatively isolated systems" and Hook makes an attempt to show that the dialectic may be interpreted as a type of scientific method. Ibid., p. 374. To be scientific in such a framework requires instructions for recognizing the thesis and the antithesis, and ability to follow the devious paths of their interaction to a synthesis that may be by no means obvious. Where are such instructions?

UNIVERSITY OF ILLINOIS-URBANA
3 0112 057945609

7